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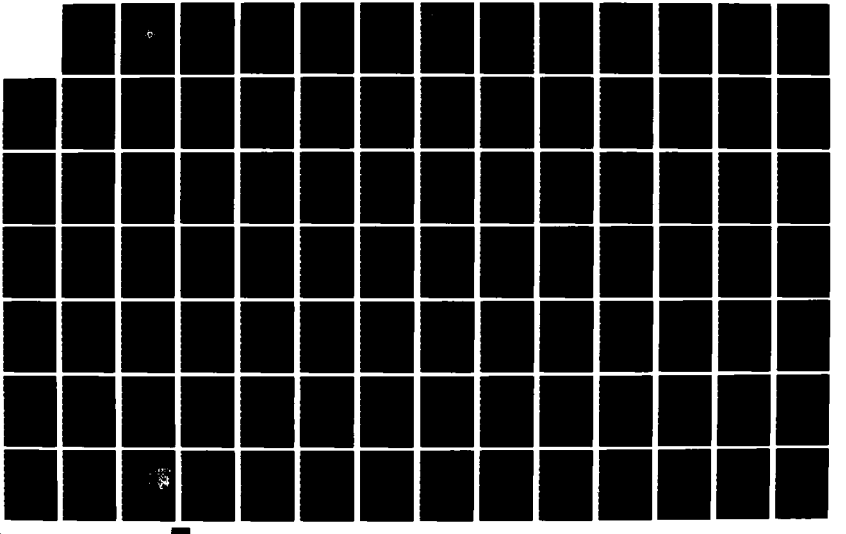

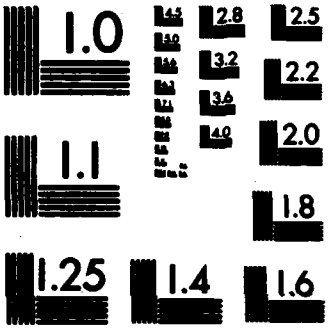

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FIRST-TERM REENLISTMENT QUALITY STUDY (FITREQUEST)

NOVEMBER 1983

PREPARED BY

FORCE SYSTEMS DIRECTORATE

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study focused on Active Army first-term soldiers in the grade of E4 and below to develop a valid and reliable method for identification of qualified, potential reenlistees. The analysis included development of guidelines which could be used to compare the quality of soldiers on either an Army-wide or CMF basis. The study found that a set of objective and subjective indicators of quality could be used to identify first-term soldiers who are judged by their unit supervisors to be of high quality.

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(FITREQUEST)

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Prepared by

Force Systems Directorate

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8120 Woodmont Avenue
Bethesda, Maryland 20814

DEPARTMENT OF THE ARMY
US ARMY CONCEPTS ANALYSIS AGENCY
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REPLY TO
ATTENTION OF

CSCA-FSP

3 November 1983

SUBJECT: First-Term Reenlistment Quality Study (FITREQUEST)

Deputy Chief of Staff for Personnel
Department of the Army
ATTN: DAPE-MPD-RT
Washington, DC 20310

1. Reference letter, DAPE-MPD-RT, Headquarters, Department of the Army, 16 November 1982, subject as above.

2. Referenced letter directed the US Army Concepts Analysis Agency to conduct a study that develops a reliable method for early identification of qualified, potential first-term reenlistees to include development of guidelines which may be used to compare the quality of these soldiers on either an Army-wide or CMF basis. In response to this request, the study report is attached.

3. We look forward to seeing an evaluation of this study in accordance with AR 5-5.

4. This Agency expresses appreciation to all commands and agencies who have contributed to this product. Questions and/or inquiries should be directed to the Chief, Personnel Systems Analysis Division (ATTN: CSCA-FSP), Force Systems Directorate, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, Maryland 20814, AUTOVON 295-5289.

David C. Hardison

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DAVID C. HARDISON
Director

CAA	FIRST-TERM REENLISTMENT QUALITY STUDY (FITREQUEST)	ONE SHEET STUDY GIST CAA-SR-83-13

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) There is no widely accepted, general, useful definition of soldier quality available in the US Army.

(2) Current guidelines to determine quality of first-term soldiers are based only on objective criteria which are poorly correlated with overall quality of first-term soldiers as perceived by unit supervisors.

(3) Objective data is often incomplete or unavailable.

(4) A subset of the objective and subjective indicators can be used to identify which first-term soldiers their supervisors would consider to be of high quality for reenlistment.

(5) Unit level chain of command perception and HQDA DA policy can be combined in a mutually supportive system for identifying soldiers for reenlistment.

(6) Implementation of a system for estimating quality of first-term soldiers which includes both HQDA and the unit level chain of command will increase the administrative workload.

THE MAIN ASSUMPTION on which the work reported herein rests is as follows:

Local commanders desire to participate in the reenlistment decision process.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) Some elements of quality may not be measurable.

(2) The study considered only soldiers eligible to reenlist in the Army for the first time. Of the 823 first-term soldiers included in the study, only 164 had complete records of objective data.

(3) Only enlisted personnel in the grades of E6 through E8 and officers O1 through O4 participated in the survey.

THE SCOPE OF THE STUDY focused on Active Army first-term soldiers in the grade E4 and below to develop a valid and reliable method for identification of the best qualified potential reenlistees, on either an Army-wide or CMF basis.

THE STUDY OBJECTIVES were to:

(1) Analyze Army first-term selection guidelines and evaluate the quality of first-term soldiers.

(2) Develop a methodology which provides the ODCSPER and the unit commander with a technique for early identification of quality first-term soldiers.

(3) Develop a process which allows selection of high-quality, first-term soldiers for reenlistment.

THE BASIC APPROACH followed in doing this study can be described as the application of multiple linear regression to develop prediction equations of quality as a function of objective and subjective quality indicators.

THE REASON FOR PERFORMING THE STUDY is as follows: the Army desires reenlisting only high quality soldiers at the first-term point; however, no managerial procedures exist to select only the best qualified soldiers in situations where potential reenlistments exceed requirements. This study was directed to address this issue.

THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel, who established the objectives and monitored study activities.

THE STUDY EFFORT was directed by COL Franklin R. Dillard, Personnel Systems Analysis Division, Force Systems Directorate.

COMMENTS AND QUESTIONS may be sent to the Chief, Personnel Systems Analysis Division, Force Systems Directorate (CSFCA-FSP).

Tear-out copies of this synopsis are at back cover.

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FIRST-TERM REENLISTMENT QUALITY STUDY (FITREQUEST)

CHAPTER 1

INTRODUCTION

1-1. PROBLEM. The present method of selecting first-term soldiers for reenlistment is an objective process. Although standards and guidelines exist for reenlistment of individual first-term soldiers, HQDA DA (ODCSPER) considers them to be insufficient to provide across-the-board identification of the best qualified soldiers to meet strength goals, either Army-wide or by career management field (CMF). To appreciate this problem, consider that during fiscal year 1983, approximately 90,000 initial term soldiers completed their service contract at some point during the year. Of those, about 60,000 were eligible, under current reenlistment guidelines, to reenlist. Past statistics showed that about 42,000 would reenlist. Due to projected end strength requirements, the Army was able to reenlist only 31,400. Since the number available to reenlist exceeded the number of available spaces, the Army had the opportunity to reenlist only quality soldiers to fill its ranks. Unfortunately, the Army had no way of determining if the soldiers they reenlisted were the best qualified of those that were eligible and willing to reenlist. The First-Term Reenlistment Quality Study (FITREQUEST) was initiated to help the Army in determining those eligible first-term soldiers best qualified for reenlistment.

1-2. PURPOSE. The purpose of the FITREQUEST Study was to provide HQDA, ODCSPER, with a methodology for identifying quality first-term soldiers throughout the Army for selection and retention to meet mandatory year-end strengths.

1-3. SCOPE

a. The study focused on Active Army first-term soldiers in the grade of E4 and below and attempted to develop a reliable method for early identification of qualified, potential reenlistees. The analysis included development of guidelines which could be used to compare the quality of these soldiers on either an Army-wide or CMF basis.

b. A follow-on study targeted at Reserve Component personnel might be considered if viable procedures resulting from this study are implemented.

1-4. OBJECTIVES. The specific objectives of the FITREQUEST Study were to:

a. Analyze Army first-term selection guidelines and evaluate the quality of first-term soldiers.

b. Develop a methodology which provides the study proponent and unit commanders with early identification of quality first-term soldiers throughout the Army.

c. Develop a process which allows selection of high quality first-term soldiers for reenlistment.

1-5. ASSUMPTIONS. The main assumption used in this study was that local commanders desire to input to the quality reenlistment decision process.

1-6. ESSENTIAL ELEMENTS OF ANALYSIS (EEA). Specific questions to be answered by analysis were:

a. What guidelines are currently available to the Department of the Army and unit commanders which indicate quality and potential of first-term soldiers?

b. What criteria to measure quality can be instituted at HQDA and unit level to identify quality first-term soldiers world-wide?

c. What indicators can be used to provide early identification of quality first-term soldiers?

d. Which indicators provide the best measures of discrimination of high quality?

1-7. CONCEPT OF QUALITY

a. Prior to proceeding with methodology selection and development, it was determined that a clear and purposeful understanding of the concept of quality as it applied to first-term soldiers was necessary for establishing a proper framework for analysis. In order to obtain this understanding, the study team searched first for a clear definition of the quality of a first-term soldier, and secondly for a way to assess quality. The search resulted in finding no known objective, authoritative, or accepted way to define the quality of a soldier. Although a suitable definition of quality could not be found, the study team concluded that this should not prevent the formulation of a feasible approach for attempting to assess quality. The approach eventually selected, which is described in paragraph 1-9 below, was one that relied primarily on subjective assessments of quality.

b. The reasons for collecting subjective information for estimating quality were twofold. First, the reenlistment eligibility criteria (Table 2-1, Chapter 2) specified in AR 601-280, Army Reenlistment Program, although objective in nature, are used more as hurdles (e.g., Armed Services Vocational Aptitude Battery (ASVAB) Scores, Article 15s) for reenlistment than as measures of quality of first-term soldiers. In addition, the study sponsor considered that these criteria were insufficient to provide across-the-board identification of first-term soldiers best qualified for reenlistment. Secondly, for soldiers in the grade of E4 and below, the target population for this study, the Army does not require that the standardized Enlisted Evaluation Report (EER) be completed on their performance of duties.

1-8. RATIONALE FOR METHODOLOGY SELECTION

a. The study team decided that one way to assess the quality of first-term soldiers would be to survey the unit supervisors of these soldiers and obtain their estimates on the quality of first-term soldiers assigned to their units. This decision was based on the premise that unit supervisors are in an excellent position to judge the quality of first-term soldiers since they observe these soldiers on a day-to-day basis in the performance of their duties.

b. It was further concluded that more than a single, overall estimate of quality for a first-term soldier would be desirable if the study were to be in keeping with the "whole person" concept. The study team also felt that any inherent biases and behavioral tendencies toward inflation of single estimates could be abated if additional estimates of quality could be found, measured, and somehow related to a unit supervisor's estimate of overall quality. In order to find additional estimators of quality, the study team adopted a process for selecting indicators of quality which could potentially be used in the study. This process is described in paragraph 1-9b below.

1-9. METHODOLOGY. The FITREQUEST methodology is depicted in Figure 1-1. The following paragraphs briefly describe each stage of the methodology. For a more detailed discussion of the methodology, the reader is referred to Chapters 3 and 4 of the report.

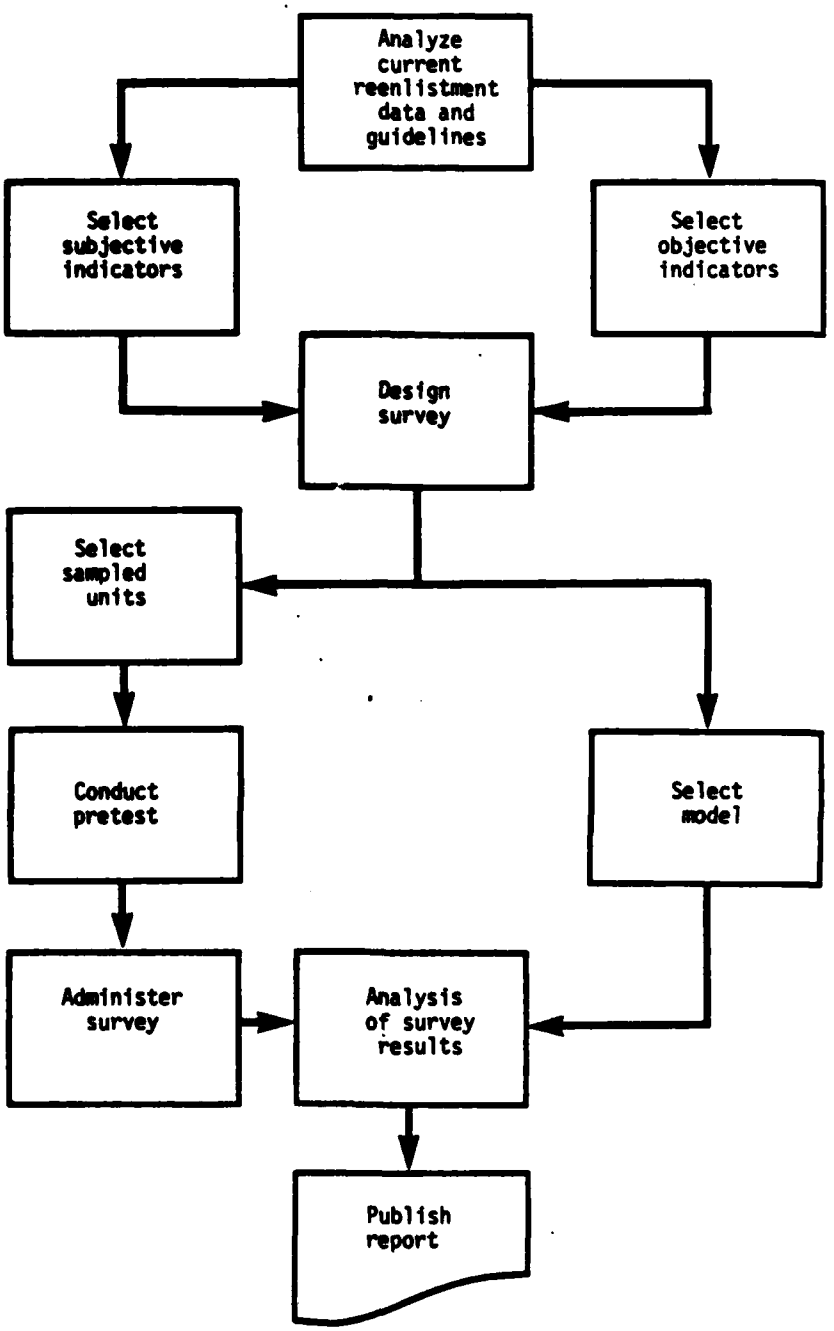


Figure 1-1. FITREQUEST Methodology

a. Analyze Current Reenlistment Data and Guidelines

(1) In the initial step of the methodology, the study team:

(a) Obtained and became knowledgeable of current Army regulations and other existing guidelines pertaining to reenlistment policy and procedures;

(b) Conducted a literature search to obtain and review other studies which could provide assistance in structuring this study; and

(c) Identified and obtained examples of data which were currently collected and maintained on first-term soldiers.

(2) Existing regulations, guidelines, literature, and data were then analyzed in relation to the objectives and EEA of this study. This analysis provided the basis for selection of quality indicators.

b. Select Subjective and Objective Indicators. The study methodology required that a set of indicators be selected which could somehow be measured and related in a meaningful way to a unit supervisor's estimate of overall quality. Indicators were sought which could be regarded as representative of the attributes of quality which the Army desired in a quality soldier. In order to find such a set, the study team proceeded to develop a list of both objective and subjective indicators which could potentially be used for this purpose. The initial list compiled by the study team consisted of over 60 indicators (Table 1-1), divided into the broad indicator categories of behavior/conduct, performance, personal development, and awards/recognition. This list was then screened for relevance, duplication and clarity, and a revised, condensed list was then circulated among other analysts within CAA and coordinated with the Soldier Support Center-National Capital Region (SSC-NCR) and the Army Research Institute (ARI). Reviewers of the condensed list were asked to comment and make additions or deletions that they believed were appropriate. Based upon feedback from the condensed list, the team selected for use in the study those indicators which either occurred most frequently or were similar to the current reenlistment eligibility criteria. This final set consisted of 20 indicators (Table 1-2), of which 11 were objective and 9 were subjective. The definition of each of these quality indicators is contained in the Glossary at the end of this report.

Table 1-1. Initial List of Quality Indicators

Behavior/Conduct	Performance
Accepts Criticism	Annual General Inspection
Accepts Responsibility	Army Physical Fitness Test
Article 15s	Communicates Well
Attitude	Courage
AWOL	Crew Performance
Courts Martial	Dedication
Crimes Against Property	Dependability
Crimes of Violence	Individual Weapon Qualification
Desertion	Initiative
Discipline	Job Performance
Domestic Problems	Leadership Potential
Driving Under Influence	Military Bearing
Drug Arrests	Personal Appearance
Drug User	Physical Profile
Gets Along with Others	Positive Counseling Session
Heavy Drinker	Self-starter
Letters of Indebtedness	Supervision (amount)
Moral and Social Conduct	Skill Qualification Test Score
Negative Counseling Sessions	Team Member
Nonsupport of Family	Trainability
Recycled During Initial Entry Training	Unit Inspections
Reports of Survey	
Resists Authority	
Retraining BDE (GRAD)	

Personal Development	Awards/Recognition
Armed Forces Qualification Test	Awards and Decorations
Educational Level	Badges Earned (driver, mechanic, etc)
- Civilian	Commandant's List
- Military	Duty Position Higher than Auth Rank
Mental Category	Honor Graduate
Military Correspondence Course Participation	Letters of Appreciation/Commendation
Off-duty Education	
Physical Profile	
Promotion	
Reading Grade Level	

Table 1-2. List of Quality Indicators Selected for Use in the Study

Objective	Subjective
Armed Forces Qualification Test (AFQT) (includes GT score)	Ability to Get Along with Others
Civilian Education (CIVED)	General Discipline
Rank (relative to time in service)	Military Bearing (accepts authority and military practices)
Military Education (MILED)	Personal Appearance
Skill Qualification Test (SQT)	Job Performance
Individual Weapon Score	Trainability
Awards and Decorations (A&D)	Leadership Potential
Weight Control	Moral and Social Conduct (conduct which brings credit to the military)
Physical Profile	
Physical Readiness Score	Communicates Well with Others
Article 15s	

c. Design Survey. The survey designed by the study team consisted of a set of instructions, a questionnaire, a computer listing of assigned first-term soldiers, and a personal data sheet (PDS). The instructions were designed to accommodate survey administration on either a group or individual basis. The questionnaire represented one of the three sources used for obtaining data for analysis during the study. It was structured to obtain unit supervisors' estimates of quality of first-term soldiers, both on an overall basis and in relation to each subjective indicator. The questionnaire also included a means for unit supervisors to rank both the objective and subjective quality indicators on the basis of how they perceived the importance of these indicators in estimating quality. A listing of first-term soldiers was included with each questionnaire to identify those soldiers whose quality would be estimated. Data pertaining to objective indicators were obtained from either the Enlisted Master File (EMF) maintained by the US Army Military Personnel Center (MILPERCEN) or from PDSs completed for each listed first-term soldier.

d. Select Sampled Units. The selection of surveyed units provided the means to identify both the first-term soldiers whose quality would be estimated and the unit supervisors who would do the estimating.

(1) The units to be surveyed were randomly selected by SSC-NCR. Units were selected from both CONUS and Europe as being representative of the Army as a whole. Stratification by location was employed during the sampling process to assure that all CMFs were adequately represented among the selected units.

(2) Once the units to be surveyed were identified, the study team generated computer listings of first-term soldiers assigned to those units. These listings were extracted from the EMF maintained at MILPERCEN.

(3) All unit supervisors (grades E6 through O4) who were assigned to the selected units and supervised the listed first-term soldiers in some capacity were requested to participate in the survey.

e. Conduct Pretest. A pretest of the survey was conducted by members of the study team at two units selected by SSC-NCR. Representatives from SSC-NCR were present during the pretest. Only minor adjustments were required as a result of the pretest. Subsequent to the pretest, the survey instrument was formally presented to SSC-NCR for approval.

f. Administer Survey. The approved survey was administered on both a field visit and mail-out basis. Field visits were limited to selected CONUS units. Study team members coordinated with units to be visited prior to survey administration. The remaining CONUS units and all Europe units were surveyed by mailouts.

g. Select Model. The model selected for analysis of the survey data was of the general form:

$$y = A + \sum_{i} Bi\ Xi + \sum_{j} Cj\ Wj + E$$

where y was an estimate of overall quality, A was a constant, B and C were regression coefficients for the objective (X) and subjective (W) quality indicators, i and j were indices of summation, and E was random error.

h. Analysis of Survey Results. Data from the completed questionnaires, PDSs, and the EMF were merged in the Agency's computer, and statistical analyses and testing were then applied to these data in an attempt to identify relationships between the supervisors' estimates of overall quality and the 20 quality indicators. The data pertaining to the supervisors' rankings of the perceived importance of the quality indicators were also analyzed and tested in an attempt to gain any additional insights into the potential use of the indicators in estimating quality of first-term soldiers. The study team then used multiple linear regression in an attempt to develop equations relating the 20 indicators to supervisors' estimates of overall quality for 15 CMFs, the three common mission areas of combat, combat support, and combat service support, and for an Army-wide application.

CHAPTER 2

REENLISTMENT POLICY AND PROCEDURES

2-1. GENERAL. The basic Army document which governs reenlistment policy and procedures is AR 601-280, Army Reenlistment Program. This regulation was revised and republished on 1 July 1977. Since then, the Army has promulgated 5 permanent changes and 21 interim changes to the basic document. Of these, 2 permanent and 10 interim changes have been issued since January 1981. The trend in these more recent changes has been to tighten-up or become more selective in the criteria for reenlistment eligibility. This is particularly evident for initial reenlistment criteria which is the subject of this study. The ODCSPER was in the process of staffing a revised AR while this study was being conducted.

2-2. BASIC REENLISTMENT ELIGIBILITY CRITERIA. The basic eligibility criteria for reenlistment pertain to all soldiers, with the RETAIN system a noted exception, but vary in their application depending upon term and years of service. These criteria are:

a. Age

b. Citizenship

c. Trainability requirements

d. Education

e. Medical

f. Waivable and nonwaivable administrative disqualifications

g. Grade

h. SQT evaluation

i. Weapons qualification training

j. RETAIN conditions (applicable only to first-term soldiers)

2-3. CHANGES TO REENLISTMENT ELIGIBILITY CRITERIA

a. Education. This criterion was the first of those listed in paragraph 2-2 above which was changed in the direction of higher selectivity for reenlistment. Its waiver action was changed to a nonwaivable status by Change 3 to AR 601-280, dated 1 October 1979.

b. Age. This was the second criterion changed to reflect a tightening-up policy on reenlistments. It also was changed to a nonwaivable criterion as announced in Interim Change 12, dated 24 March 1981.

c. RETAIN Conditions

(1) These conditions, commonly referred to as hurdles, which were instituted by Change 3 mentioned above, were revised and strengthened by Interim Changes 16 and 19, dated 22 December 1981 and 24 August 1982, respectively. These hurdles pertained only to first-term soldiers and covered five conditions which, if any were applicable, had to be reported to CG, MILPERCEN (Reenlistment Control Branch) prior to processing a soldier for reenlistment or extension. The conditions covered were:

(a) Aptitude area scores.

(b) Military disciplinary action.

(c) Civil convictions.

(d) Soldiers in grade E-3 who will exceed reenlistment ineligibility point upon reenlistment or extension.

(e) Primary Military Occupational Specialty (PMOS) shown as No in/Yes out (N/Y) in the current DA Circular 611-XX.

(2) Interim Change 16 raised the aptitude area score requirement from 90 to 95 (for three scores) on pre-October 1980 tests and imposed an 85 or higher limit on three scores from the post-October 1980 ASVAB. Soldiers could qualify for an exemption if they scored a 60 or higher on their SQT. This change lengthened the time period for considering a military disciplinary action from 12 to 24 months prior to application for reenlistment. It also lowered the reenlistment ineligibility point for grade E-3 from 5 to 3 years.

(3) Interim Change 19 eliminated the SQT exemption for first-term soldiers; changed the condition for considering military disciplinary actions to include the entire term of current enlistment; changed the waiver authority to general officer or general court-martial convening authority (GCMCA) for grade E-3 reenlistment or extension past the reenlistment ineligibility point; and deleted the N/Y PMOS condition.

d. Medical. Interim Change 19 added the requirement to pass the PRT (physical readiness test) for age. This requirement is waivable by GCMCA.

e. Weapons Qualification Training. All soldiers must now qualify on their individual weapon within 12 months prior to reenlistment. This requirement is waivable by general officer or GCMCA. Prior to August 1982, the requirement was to have completed initial individual weapons qualification training. It was not waivable.

f. Basic Reenlistment Criteria. Table 2-1, Basic Reenlistment Qualification Guide, provides the current basic criteria for reenlistment.

Table 2-1. Basic Reenlistment Qualification Guide, AR 601-280 (page 1 of 2 pages)

Line	Qualifier	Basic criteria are	Waiver may be approved by	Detailed instructions in
1	Marital status and number of dependents	No restrictions except sole parents	N/A	Paragraph 1-34 on page 1-10, and paragraph 2-10 on page 2-3
2	Civil offenses	Not a specific qualifier	N/A	Paragraph 2-12 on page 2-2
3	Age	Not less than 18 years at time of reenlistment or more than 55 years at new ETS	Not waivable	Paragraph 2-12 on page 2-3
4	Citizenship	Must be US citizen, or legally admitted alien, or American Samoan National, or have Certificate of Identity from the Government of the Commonwealth of the Northern Marianas Is	Not waivable	Paragraph 2-14 on page 2-4
5	Trainability	Initial Term: Must have 3 aptitude area scores of 95 or higher on ACB or ASVAB prior to 1 Oct 80, or 3 scores of 85 or higher on ASVAB after 1 Oct 80. Exempt if E-4(P) or E-5	Not waivable	Paragraph 2-16 on page 2-4
		Second or Subsequent Term: Must have 3 aptitude area scores of 90 or higher. Exempt if verified SQT		
6	Education	Must meet qualifications for specific option desired	Not waivable	Paragraph 2-18 on page 2-4
7	Medical	Meet retention standards of AR 40-501	CG, MILPERCEN	Paragraph 2-10 on page 2-4
		Pass physical readiness test for age	GCMCA	
		Meet height/weight standards of AR 600-9	Not waivable	Paragraph 2-21.1 on page 2-4

Table 2-1. Basic Reenlistment Qualification Guide, AR 601-280
(page 2 of 2 pages)

Line	Qualifier	Basic criteria are	Waiver may be approved by	Detailed instructions in
8	AWOL/lost time	May be waived	SPCM for 1-15 days; GCMCA for 16-30 days; CG, MILPERCEN for over 30 days	Paragraph 2-22 on page 2-5
9	Courts-martial	May be waived	CG, MILPERCEN	Paragraph 2-22 on page 2-5
10	Alcohol and drug abuse	May not reenlist while in the program	No waiver required if successfully completed the program	Paragraph 2-22 on page 2-5
11	Grade	Must not exceed retention ineligibility point for grade at new ETS	E-2 and below: Not waivable E-3: General Officer/GCMCA E-4 to E-8: MACOM (May be delegated to next lower commander	Paragraph 2-26 on page 2-5
12	Weapons qualification	Must qualify on individual weapon within 12 months prior to reenlistment	General Officer or GCMCA	Paragraph 2-30 on page 2-9
13	Article 15	Only applicable to soldiers on their initial enlistment	One Article 15 can be waived one level higher than the administering authority, e.g., Company grade Article 15 can be waived at Bn level Two or more offenses must be cleared by MILPERCEN prior to reenlistment	Paragraph 2-22 on page 2-5

2-4. REENLISTMENT BOARDS. The Army instituted local reenlistment boards for first-term soldiers with issuance of Interim Change 21 to AR 601-280. This policy went into effect 1 March 1983. The boards are established at local command level (battalion or higher) and screen all E-4s not on a promotion list and all E-3s with less than 24 months of service.

2-5. CURRENT REENLISTMENT PROCEDURES

a. The objectives of the current Army Reenlistment Program are:

(1) Reenlist, on a long-term basis, the greatest number of highly qualified soldiers consistent with Army needs.

(2) Achieve and maintain Army force alignment through reenlistment of qualified soldiers in critical skills.

(3) Obtain maximum involvement at each echelon of command, starting at the lowest local level possible.

b. The Unit Reenlistment NCO is the key linking pin in the system. He advises the commander on reenlistment matters. In addition he:

(1) Maintains accountability of all reenlistment data cards and posts current information to the new cards when required.

(2) Reviews reenlistment data cards to ensure all regulatory reenlistment interviews have been completed.

(3) Informally contacts soldiers to provide personal aid and guidance regarding their reenlistment to include assistance in requesting applicable waivers.

c. The unit commander ensures every qualified soldier who desires unbroken service is considered for immediate reenlistment or, if he is not recommended for reenlistment, is prevented from reenlisting or extending his service by either imposing a bar to reenlistment or initiating elimitation action UP AR 635-200.

d. The steps for qualifying a soldier for reenlistment as listed in AR 101-280, Army Reenlistment Program, are:

(1) Determination of eligibility for discharge.

(2) Determination of eligibility for reenlistment.

(3) Determination of eligibility for waiver if necessary.

(4) Determination of eligibility for the option desired.

e. Reenlistment decisions are accomplished at the unit level unless a waiver is required. If a waiver is required, the appropriate approval authority, as indicated in Table 2-1, acts on the waiver, and if granted, the soldier is then reenlisted.

f. The Army published a revised edition of AR 601-280 on 15 June 1983 with an effective implementation date of 15 August 1983. This revision retained the reenlistment board requirement for screening of first-term soldiers and included the same eligibility criteria for reenlistment as depicted in Table 2-1.

CHAPTER 3

DESIGN AND ADMINISTRATION OF THE SURVEY

3-1. INTRODUCTION. The purpose of this chapter is to discuss the design and administration of the FITREQUEST survey.

3-2. SURVEY DESIGN. The methodology developed by the study team required that a survey be designed to collect data for analysis. The principal components of the survey were a set of instructions, a questionnaire, a listing of first-term soldiers, and a personal data sheet (PDS). Each of these components is described in the following paragraphs and a copy of the actual survey is reproduced in Appendix D.

a. Instructions. The instructions were designed for administering the survey on either a group or individual basis. In order to be consistent in completing the survey, survey participants were directed to read the instructions verbatim.

b. Questionnaire. The questionnaire represented one of the three principal sources of data for the study, the other two being the PDS and the EMF. It consisted of four parts and was designed to be completed anonymously by unit supervisors of first-term soldiers from the randomly selected company-sized Army units. In Part I supervisors were requested to provide biographic data on themselves. Part II required supervisors to subjectively rate first-term soldiers on the nine selected subjective indicators of quality. In Part III, supervisors were directed to subjectively rank all 20 of the selected quality indicators in relation to their perception of the importance of these indicators in estimating quality of first-term soldiers. Part IV required supervisors to subjectively estimate the overall quality of each first-term soldier whom they rated in Part II. Supervisors were permitted in Part IV to enter any remarks that they felt were appropriate in clarifying their overall quality estimates. Numerical scales were provided to obtain the estimated ratings and rankings of quality given by supervisors in Parts II through IV.

c. Listing of Assigned First-term Soldiers. Computer listings were generated from the EMF containing the names of first-term soldiers assigned to each unit selected for survey participation. The applicable unit listing was attached to Part IV of the questionnaire and was used by unit supervisors to determine which first-term soldiers within their unit they should rate.

d. Personal Data Sheet (PDS). The PDS was designed to obtain data pertaining to first-term soldiers on those objective indicators for which data were not available on the EMF. Each surveyed unit was provided sufficient PDSs to fill out a separate PDS on each first-term soldier whose name was included on the computer listing accompanying the survey.

3-3. SCORING OF THE QUALITY INDICATORS AND THE OVERALL QUALITY ESTIMATE. In order to accommodate analysis, a scoring system was devised for assigning numerical values to each of the selected quality indicators and to the overall quality estimate. This system is depicted in Table 3-1. As noted in the table, actual scores were available for only three of the indicators. The method of scoring the remaining 17 indicators and the overall quality estimate was developed by the study team. Although differences existed in the scoring ranges among the indicators, the analysis technique (regression analysis) used in the study takes these differences into account and the validity of the results is not affected.

Table 3-1. Scoring System

Indicator	Range	Value description
Objective		
Armed Forces Qualification Test (AFQT)[a,b]	1-99	Actual test score
Civilian education (CIVED)[a,c]	0-16	0=None; 16=Post HSDG
Rank[a]	0-3	0=E1/E2; 1=E3; 2=E4; 3=E4(P) E5
Military education (MILED)	0-2	0=None; 1=Corres; 2=BNOC/PLC
Skill Qualification Test (SQT)[b]	0-100	Actual test score
Individual weapon score	0-3	0=Unqual; 1=MM; 2=SS; 3=EX
Awards & decorations (A&D)	0,1,2,...	0=None; 1,2,...=Total A&D
Weight control	0-2	0=Unsat; 1=Unsat/Progress; 2=Sat
Physical profile[a]	0-1	1=None; 0=One or more
Physical readiness score[b]	0-300	Actual test score
Article 15s	0-2	0=2 or more; 1=1; 2=None
Subjective[d]		
Ability to get along with others	0-100	Supervisor's Estimate
General discipline	0-100	Supervisor's Estimate
Military bearing	0-100	Supervisor's Estimate
Personal appearance	0-100	Supervisor's Estimate
Job performance	0-100	Supervisor's Estimate
Trainability	0-100	Supervisor's Estimate
Leadership potential	0-100	Supervisor's Estimate
Moral & social conduct	0-100	Supervisor's Estimate
Communicates well with others	0-100	Supervisor's Estimate

[a]Data for these indicators available from EMF.

[b]Actual test scores used for these indicators.

[c]Range values for CIVED:

0 = None
1-8 = years of elementary school
9-12 = years of secondary school
13 = high school certificate
14 = GED or overseas GED
15 = high school diploma graduate
16 = postsecondary school (regardless of years or type education)

[d]The same range and value descriptions are applicable to the overall quality estimate.

3-4. SURVEY APPROVAL. The approval process involved administering a pretest, analyzing the pretest results, making appropriate changes to the survey instrument, and receiving a control number from the SSC-NCR.

a. Pretest. The SSC-NCR selected two units located at Fort Eustis, Virginia for pretesting the survey. The pretest consisted of administering the survey to unit supervisors at each unit and conducting a critique after completion of the survey. The pretest was given by members of the study team with representatives of SSC-NCR present to observe survey administration and to participate in survey critiques for both units.

b. Analysis of Pretest Results. Comments which arose either during the administration of the survey or during the critiques were compiled and analyzed by the study team and SSC-NCR representatives. Where appropriate, action was taken to amend the survey format, context or content, based upon these comments.

c. Survey Control Number. After the survey was amended, it was sent to the SSC-NCR for approval. A survey review panel was convened by the SSC-NCR to review and approve the survey. The panel membership included personnel from both the SSC-NCR and the ARSTAF. The survey was approved without change and a control number issued which provided authority for its administration.

3-5. SELECTION OF SURVEYED UNITS, FIRST-TERM SOLDIERS, SUPERVISORS, AND CMFs

a. Unit Selection. Selection of units was done on a stratified, random sampling basis. Stratification was necessary to assure that all CMFs to be analyzed were sufficiently represented in the sampled units. Unit selection was accomplished by SSC-NCR. Selected units were located in either CONUS or Europe based upon the assumption by SSC-NCR that units located in these two geographic areas were representative of the Army as a whole. A total of 218 company-sized units were selected to participate in the survey, of which 148 were located in CONUS and 70 in Europe. This proportion was based upon an approximate distribution of soldiers by CMF over CONUS and Europe equating to 70 percent CONUS versus 30 percent Europe. The total of 218 was chosen to protect against only a 50 percent return by units and by supervisors within units. Given this rate of return and knowing that each unit had a possible complement of 19 supervisors in the specified grade range, the expected number of returns would yield a total of approximately 40 supervisory responses per CMF. This number of responses was set as a minimum goal by SSC-NCR for the purpose of conducting analysis. The distribution of the selected company-sized units from various CONUS installations and major subordinate commands (MSC) in Europe is depicted in Table 3-2.

Table 3-2. Distribution of Surveyed Units

CONUS		Europe	
Installation	No units	MSC	No units
Fort Benning[a]	10	V Corps	8
Fort Campbell[a]	26	VII Corps	4
Fort Eustis	3	3d Inf Div	1
Fort Hood	38	8th Inf Div	21
Fort Irwin	1	1st Armor Div	2
Fort Leavenworth	1	3d Armor Div	26
Fort Lewis	25	32d ARADCOM	3
Fort McClellan	2	18th Engr Bde	4
Fort Meade[a]	4	7th ATC	1
Fort Ord	18		
Fort Polk[a]	20		

[a]Survey administered to units at these installations by study team members. All other units were surveyed by mail.

b. First-term Soldier Selection. Once the units to be surveyed were selected, the study team generated computer listings from the EMF of first-term soldiers assigned to those units. First-term soldiers selected were those who had a Basic Active Service Date (BASD) between 1 October 1981 and 1 April 1982 and whose Expiration of Time in Service (ETS) date was after 1 April 1983. These windows were chosen to exclude first-term soldiers above the grade of E4 and to capture those who had been assigned to these selected units for at least 90 days and would not have an ETS prior to survey administration. The selection process did not allow for preclusion of soldiers who were ineligible for reenlistment or who had a current bar to reenlistment. Therefore, unless indicated in the remarks section of Part IV of the questionnaire, no information was available on either ineligible or barred first-term soldiers. The listings became a part of the survey administered to unit supervisors.

c. Supervisor Selection. The study team determined that supervisors to be surveyed should range in grade from E6 through O4. The rationale for this was premised on such criteria as day-to-day contact, length of time in service, and the need to obtain a broad spectrum of opinion on soldier quality. All supervisors assigned to the selected units and within the specified grade range were targeted as participants in the survey.

d. CMF Selection. Although the Army has 30 CMFs for enlisted personnel, only 22 were initially selected for survey and analysis. The reasons for not selecting the other 8 were based upon historical evidence that these CMFs either had a very low density of first-term soldiers, or an exceedingly low initial reenlistment rate, or both. Of the 22 CMFs selected, 3 CMFs (55-Ammunition, 74-Data Processing, and 92-Petroleum) were subsequently dropped from the survey. The reason they were dropped was that the number of first-term soldiers from the selected units who possessed any MOSs in these 3 CMFs was too low to expect the prescribed minimum number (40) of supervisory responses for analysis. This left 19 CMFs to be surveyed and analyzed during the study.

3-6. SURVEY ADMINISTRATION

a. The large number of units to be surveyed and the requirement to be responsive to the sponsor's needs necessitated that the survey be administered in two different modes. First, study team members administered the survey to unit supervisors from selected units in CONUS, and secondly, supervisors from the remaining units were surveyed on a mailout basis. The mailout mode consisted of sending copies of the survey to battalion commanders and commanders of separate companies whose companies were selected for participation. Table 3-2 indicates which method was used for each installation/MSC.

b. A cutoff date was established for acceptance of survey returns to allow adequate time for data reduction and analysis. The number of the selected units responding to the survey and the number whose returns were used in the analysis is depicted in Table 3-3. Returns were used if they consisted of both correctly completed supervisory responses (questionnaires) and PDSs either partially or completely filled out. Typically, returns which could not be used were those which failed to include PDSs.

Table 3-3. Unit Response to the Survey

Installation/ MSC	Units surveyed	Units responding	Percent responding	Units with usable returns	Percent with usable returns
			CONUS		
Benning	10	10	100	10	100
Campbell	26	22	85	16	73
Eustis	3	3	100	3	100
Hood	38	7	18	3	43
Irwin	1	1	100	1	100
Leavenworth	1	1	100	1	100
Lewis	25	22	88	15	68
McClellan	2	2	100	2	100
Meade	4	4	100	4	100
Ord	18	11	61	7	64
Polk	20	20	100	20	100
Total	148	103	70	82	80
			Europe		
V Corps	8	2	25	2	100
VII Corps	4	1	25	1	100
3d ID	1	0	0	0	0
8th ID	21	6	29	4	67
1st AD	2	2	100	2	100
3d AD	26	18	69	15	83
32d ARADCOM	3	1	33	1	100
18th Engr Bde	4	4	100	4	100
7th ATC	1	1	100	1	100
Total	70	35	50	30	86
Total CONUS/Europe	218	138	63	112	81

c. The number of returns which were used yielded a total of 832 supervisory responses containing 2,501 supervisory estimates of overall quality on 823 first-term soldiers. The distribution of responses by CMF is shown in Table 3-4. As seen from this table, the minimum goal of 40 supervisory responses was not met for six of the surveyed CMFs (CMFs 16, 29, 54, 71, 96, 98). Two of these CMFs (CMFs 54 and 71) had close to 40 responses and were considered to be acceptable for analysis. The other four CMFs (CMFs 16, 29, 96, 98) had too few responses to consider for analysis.

Table 3-4. Distribution of Supervisory Responses

CMF	Title	Supervisory responses	Overall quality estimates	First-term soldiers
11	Infantry	69	280	83
12	Combat Engineering	60	239	68
13	Artillery	51	80	27
16[a]	Air Defense Artillery	0	0	0
19	Armor	65	188	54
29[a]	Communications Maintenance	3	10	5
31	Communications Operation	61	160	65
51	General Engineering	41	70	21
54	Chemical Operations	31	128	37
63	Mechanical Maintenance	66	299	100
64	Transportation	57	197	55
67	Aviation	50	99	34
71	Administration	34	100	43
76	Supply and Service	67	293	102
91	Medical	47	125	54
94	Food Service	41	46	15
95	Law Enforcement	70	159	50
96[a]	Military Intelligence	5	4	2
98[a]	Cryptologic Operations	14	24	8

[a]CMFs not included in the analysis.

3-7. DATA REDUCTION

a. The data to be used for analysis came from three sources--questionnaires, PDSs, and the EMF. Computer files were designed to input these data, and a software routine was developed to sort, merge, and copy the data to a file for accessing during analysis. A worksheet was designed by the study team for ease in transferring raw data from the questionnaires and PDSs to the computer input files.

b. A need to address quality assurance was recognized during the data reduction phase. The building of computer input files was accomplished by several members of the study team. To assure that data were entered correctly into the computer, a quality control procedure was devised to inspect the input files. This procedure consisted of matching data from a random selection of worksheets to the same data found in the computer input files. The random sample amounted to over 300 lines of data containing 19 possible different input areas to the file. The quality inspection resulted in a discovery of only 11 errors. This equates to an error rate of less than 1/100 of a percent.

3-8. DATA STRATIFICATION. Survey data on first-term soldiers were stratified according to CMF. CMFs were later grouped into the three common mission areas of combat arms, combat support, and combat service support and on an Army-wide basis. These groupings were made so that estimated overall quality of first-term soldiers within common mission areas and Army-wide could be analyzed in addition to estimated overall quality within CMFs.

CHAPTER 4

ANALYSIS

4-1. GENERAL DESCRIPTION OF STATISTICAL METHODOLOGY

a. Selection of Analysis Tool. The primary objective of the FITREQUEST Study was to develop a method for the identification of first-term soldiers best qualified for reenlistment; that is, a method was desired for ranking first-term soldiers in terms of their estimated quality. Because the problem was predictive in nature rather than comparative, regression analysis was selected as the statistical tool to be employed.

b. Nature of Survey Data. The predictor variables (indicators) consisted of two types of data, objective and subjective. Natural questions were how the two types of data compared and how each was correlated with estimated overall quality as perceived by unit supervisors. Comparative analyses, therefore, were made on the objective data and the subjective data. Because supervisors provided both the estimates of overall quality and the estimated ratings on the subjective indicators, supervisor variability was a potential source of data contamination. Therefore, comparative analyses also were performed on the data provided by supervisors to assess homogeneity of their estimates.

c. Regression Model

(1) General Types. Regression models may be classified into two general types, mechanistic and empirical. Mechanistic models are employed if an objective is to determine the true mathematical relationship of independent variables to a dependent variable. An example would be to determine the true mathematical relationship of pressure and heat to force. Empirical models are appropriate in situations for which an objective is to use independent variables to predict values of a dependent variable. The FITREQUEST Study provides such an example since an objective was to use selected quality indicators (independent variables) as aids in predicting overall quality (dependent variable).

(2) Selection of General Form. Desirable properties of a model are simplicity and parsimony. Simplicity refers to the functional form of the model; parsimony refers to the number of terms (independent variables) in the model. Simple and small models are more likely to be understood and accepted by model users. Before selecting the general form of the regression model, a study was made of plots of the observed objective and subjective indicator data versus observed dependent variable data. The study suggested a strong linear relationship between the subjective indicators and estimated overall quality (dependent variable), but it did not suggest

any functional relationship between the objective indicators and estimated overall quality (see paragraphs 4-3c and 4-4d, below). Moreover, no a priori or empirical evidence existed to suggest either a multiplicative or higher order relationship between the dependent variable and either set of indicators. Neither was there evidence which pointed to a need for the use of data transformations on the indicators. Therefore, the objective of the model building effort was to develop small and simple, but usable, prediction equations using the objective and subjective indicators as predictor variables. Consequently, the following multiple linear additive model was used:

$$y = A + \sum_i B_i X_i + \sum_j C_j W_j + E,$$

where y is the dependent variable (estimated overall quality), Xs and Ws are independent variables (objective and subjective indicators, respectively), and E is a random error. A list of the objective and subjective indicators used as independent variables is presented in Table 4-1.

Table 4-1. Objective and Subjective Indicators

Objective indicators	Subjective indicators
X1-Armed Forces Qualification Test (AFQT) (includes GT score)	W1-Ability to Get Along with Others
X2-Civilian Education (CIVED)	W2-General discipline
X3-Rank (relative to time in service)	W3-Military Bearing (accepts authority and military practices)
X4-Military Education (MILED)	W4-Personal Appearance
X5-Skill Qualification Test (SQT)	W5-Job performance
X6-Individual Weapon Score (IWS)	W6-Trainability
X7-Awards and Decorations (A&D)	W7-Leadership Potential
X8-Weight Control	W8-Moral and Social Conduct (conduct which brings credit to the military)
X9-Physical Profile	
X10-Physical Readiness Score (PRS)	
X11-Article 15s	W9-Communicates Well with Others

d. Presentation of Analysis. The analysis will be presented under four major headings corresponding to the four major groups of data collected in the study: the ranking of the quality indicators, the scoring of soldiers on the subjective indicators, the scoring of the objective data, and the supervisors' estimates of overall quality.

4-2. RANKING OF INDICATORS

a. Description of Data. The data for ranking quality indicators came from Part III of the questionnaire. Unit supervisors were required in this part to subjectively assign a numerical value, on a scale of 0 to 4, to each of the 20 indicators. The value assigned to a given indicator represented the perception by a unit supervisor of the importance of that indicator in estimating the quality of first-term soldiers. The higher the numerical value, the higher the perceived importance of a given indicator in the judgment of a unit supervisor.

b. Quality and Quantity of Data. The quality of the data in Part III was excellent. The numerical entries made in this part of the questionnaire were legible and appeared to be made with some forethought and interest in completing the survey in a sincere and unbiased manner. Evidence of these quality traits came from visual inspection of the data, positive comments about the survey received from supervisors during field visits, and from analysis and testing of the data. The quantity of data pertaining to the indicator rankings which was used for analysis consisted of 832 complete data sets. These complete sets represented the subjective rankings given by 832 different supervisors to the 9 subjective indicators and the 11 objective indicators. Incomplete sets (sets with one or more missing indicator rankings for either a subjective or objective indicator) were not used.

c. Analysis. Analysis of the supervisors' rankings of importance of the selected quality indicators was conducted on the indicator rank means for the three common mission areas and the Army-wide case, and comparative analyses were conducted on the rank means between and among the various supervisory levels and between rank means of the indicators for the Army-wide case.

(1) Comparison of Mission Area and Army-wide Indicator Rankings. Analyses were performed on the supervisor rankings from Part III of the questionnaire which required supervisors to rank the importance of each indicator on a scale of 0 to 4, with 4 representing the highest ranking. The rankings were not associated with the ratings given to first-term soldiers by their supervisors in Parts II and IV of the questionnaire. The indicator rank means for the Army-wide case and the three common mission areas (combat, combat support, and combat service support) are tabulated in Table 4-2. An examination of the rank means reveals no obvious differences in the four columns of means. Considering rows, however, X7 (Awards and Decorations) has smaller means than the others, containing all mean values less than 2, while the other means are all greater than 2. Although no single row stands out as being largest, the objective indicator rank means are generally less than 3, while most of the subjective indicator rank means are greater than 3. The indicator rank means for the Army-wide case and the three common mission areas are illustrated in Figures 4-1 through 4-4. The figures contain the mean and the confidence interval ($\pm$ 3

standard errors) for each of the 20 indicators. The intervals are approximate 99 percent confidence intervals. As expected due to sample size, the interval lengths for the mission areas are about twice the length of those for the Army-wide case. The figures illustrate that the rank mean for X7 (Awards and Decorations) is consistently low and that the rank mean for W5 (Job Performance) is consistently high. The figures also illustrate the extent of the differences between the objective indicator and the subjective indicator rank means. In general, the subjective indicator rank means are significantly higher than the objective indicator rank means.

(2) Comparison of Supervisors' Rankings. Comparisons were made between and among supervisors' rankings of the selected quality indicators. Confidence limits on the rank means of supervisors' rankings were constructed and compared, a nonparametric test was applied to both the distributions of the rank means of the quality indicators and the rank means of the supervisors' rankings, and correlations of rank means by supervisory level were calculated and analyzed.

(a) Confidence Limits. Rank means of the objective and subjective indicators are given in Table 4-3. The first column is the average from all 832 supervisors responding; the second is the average of the 188 officer supervisors; and so on, with the last column being the average of the 316 squad leaders. Means and confidence limits on the rank means are tabulated in Table 4-4. The upper and lower confidence limits are $\pm$ 3 standard errors. The limits contain 99.74 percent of the area under the distribution of the mean. These limits are "conservatively" referred to as the 99 percent confidence limits. An examination of Table 4-4 shows that the eight confidence intervals on the objective rank means overlap as do the eight confidence intervals on the subjective rank means. Moreover, none of the confidence intervals on the objective rank means overlap with the confidence intervals on the subjective rank means.

1. The means and confidence limits in Table 4-4 are graphically portrayed in Figures 4-5 through 4-8. Figure 4-5 illustrates that the subjective indicators have a significantly higher average ranking than the objective indicators as viewed by all 832 supervisors. Figure 4-6 shows a comparison of the officers' rankings with the NCOs' rankings. Each ranks the subjective indicators significantly higher than the objective indicators. However, there is no significant difference in the officers' and NCOs' mean rankings of the subjective indicators. Neither is there a significant difference in their mean ranking of the objective indicators. That is, there is no evidence of a difference in officers' and NCOs' perceived importance of the indicators.

Table 4-2. Army-wide and Mission Area Indicator Rank Means

Indicators	Army-wide	Combat	Combat support	Combat service support
X1	2.40	2.16	2.53	2.38
X2	2.62	2.59	2.66	2.60
X3	2.42	2.44	2.44	2.37
X4	2.98	3.08	3.03	2.84
X5	2.72	2.85	2.71	2.62
X6	2.29	2.34	2.37	2.19
X7	1.77	1.80	1.77	1.79
X8	2.57	2.63	2.68	2.45
X9	2.88	2.95	2.99	2.70
X10	2.89	2.98	2.96	2.77
X11	2.94	2.76	3.06	2.98
W1	2.99	3.00	3.01	2.98
W2	3.40	3.40	3.50	3.24
W3	3.40	3.42	3.52	3.22
W4	2.91	2.85	3.06	2.85
W5	3.72	3.57	3.60	3.55
W6	3.47	3.47	3.37	3.27
W7	3.14	3.09	3.16	3.03
W8	3.09	3.01	3.15	3.08
W9	3.14	3.15	3.18	3.11

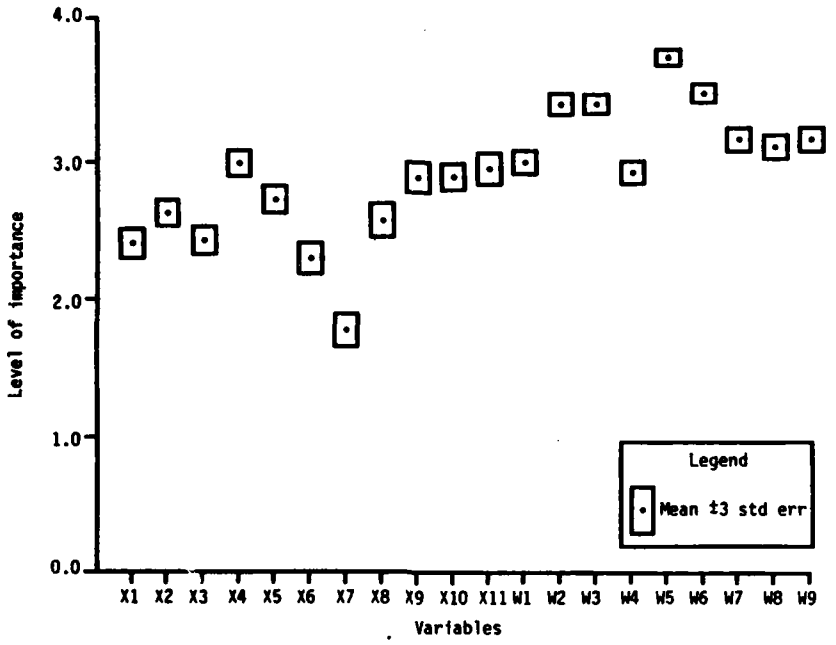


Figure 4-1. Supervisors' Rankings of Importance for the Quality Indicators (Army-wide)

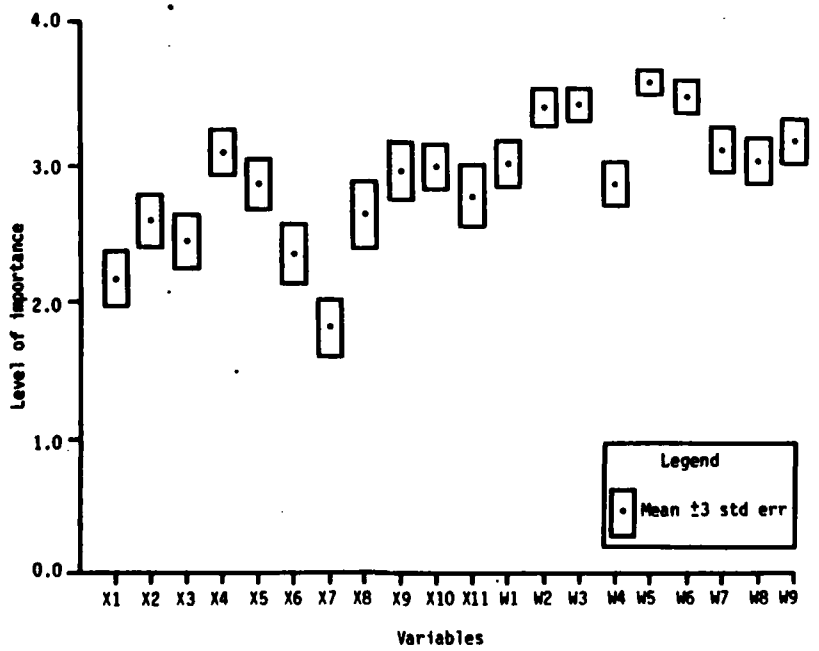


Figure 4-2. Supervisors' Rankings of Importance for the Quality Indicators (Combat)

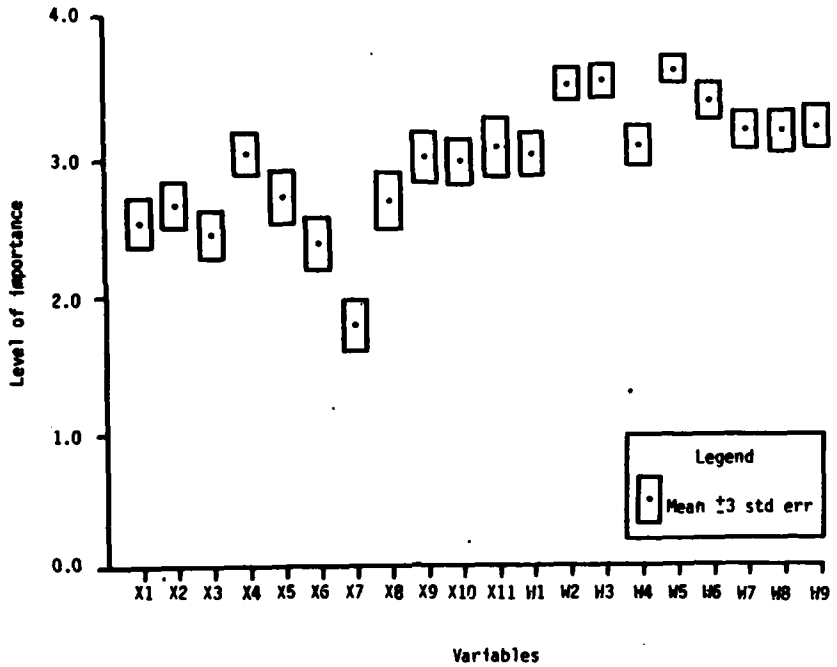


Figure 4-3. Supervisors' Rankings of Importance for the Quality Indicators (Combat Support)

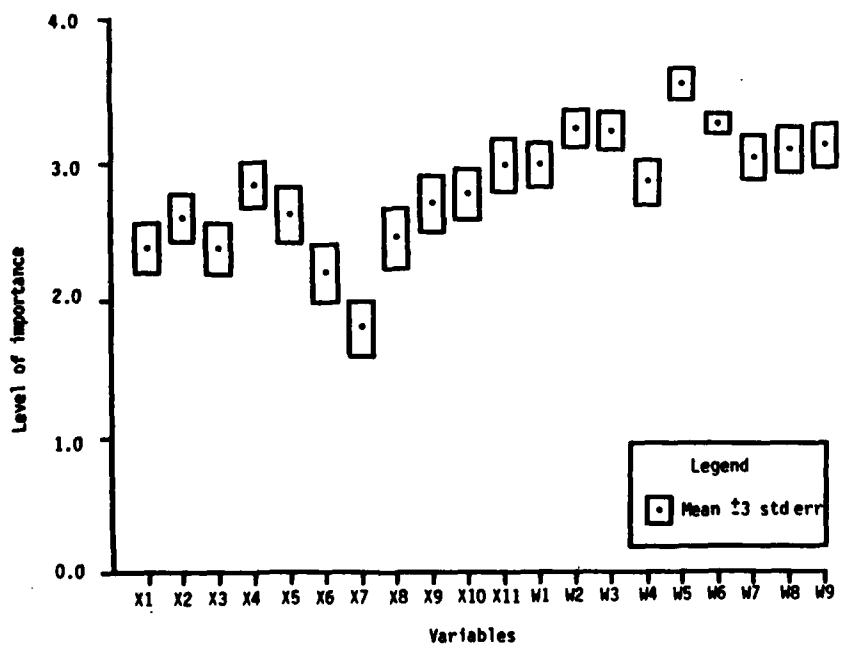


Figure 4-4. Supervisors' Rankings of Importance for the Quality Indicators (Combat Service Support)

Table 4-3. Indicator Rank Means by Supervisory Level

Indicators	All Supervisors	Officer	NCO	Commander	Platoon Leader	First Sergeant	Platoon Sergeant	Squad Leader
X1	2.40	2.13	2.48	2.17	2.08	2.72	2.51	2.39
X2	2.62	2.21	2.74	2.16	2.26	2.98	2.78	2.63
X3	2.42	2.26	2.46	2.24	2.28	2.44	2.43	2.48
X4	2.98	2.54	3.10	2.53	2.55	3.36	3.13	3.01
X5	2.72	2.68	2.73	2.76	2.60	2.83	2.76	2.67
X6	2.29	1.84	2.41	1.91	1.76	2.56	2.36	2.41
X7	1.77	1.66	1.80	1.64	1.67	1.87	1.74	1.83
X8	2.57	2.53	2.58	2.62	2.44	2.53	2.60	2.58
X9	2.88	2.99	2.85	3.08	2.90	3.11	2.91	2.73
X10	2.89	2.75	2.93	2.88	2.62	3.19	2.86	2.90
X11	2.94	3.02	2.92	3.12	2.93	3.29	2.98	2.77
W1	2.99	2.78	3.05	2.75	2.80	3.17	3.05	3.02
W2	3.40	3.48	3.38	3.45	3.52	3.55	3.40	3.31
W3	3.40	3.30	3.42	3.32	3.27	3.62	3.46	3.34
W4	2.91	2.63	3.00	2.67	2.60	3.19	2.99	2.94
W5	3.72	3.79	3.70	3.82	3.77	3.76	3.72	3.66
W6	3.47	3.42	3.49	3.47	3.37	3.57	3.52	3.44
W7	3.14	3.02	3.18	3.09	2.95	3.32	3.16	3.16
W8	3.09	2.82	3.17	3.00	2.64	3.34	3.23	3.08
W9	3.14	2.87	3.22	2.88	2.85	3.31	3.18	3.21
Sample Size	(832)[a]	(188)	(642)	(93)	(95)	(94)	(232)	(316)

[a]Two supervisors' rankings included in the sample analyzed for all supervisors did not contain valid identification of supervisory level and therefore, are not included in the detailed breakdowns.

Table 4-4. Indicator Rank Means by Supervisory Level with Upper and Lower 99 Percent Confidence Limits[a]

Supervisors	Objective			Subjective		
	Lower	Mean	Upper	Lower	Mean	Upper
1. All	2.48	2.59	2.70	3.17	3.25	3.33
2. Officers	2.20	2.42	2.64	2.95	3.12	3.29
3. NCOs	2.51	2.64	2.77	3.20	3.29	3.38
4. Commanders	2.15	2.46	2.77	2.92	3.16	3.40
5. Platoon Leaders	2.07	2.37	2.67	2.85	3.09	3.33
6. First Sergeants	2.47	2.81	3.15	3.20	3.43	3.66
7. Platoon Sergeants	2.43	2.64	2.85	3.15	3.30	3.45
8. Squad Leaders	2.39	2.58	2.77	3.10	3.24	3.38

[a]Ninty-nine percent is conservative. The limits are actually ± 3 standard errors.

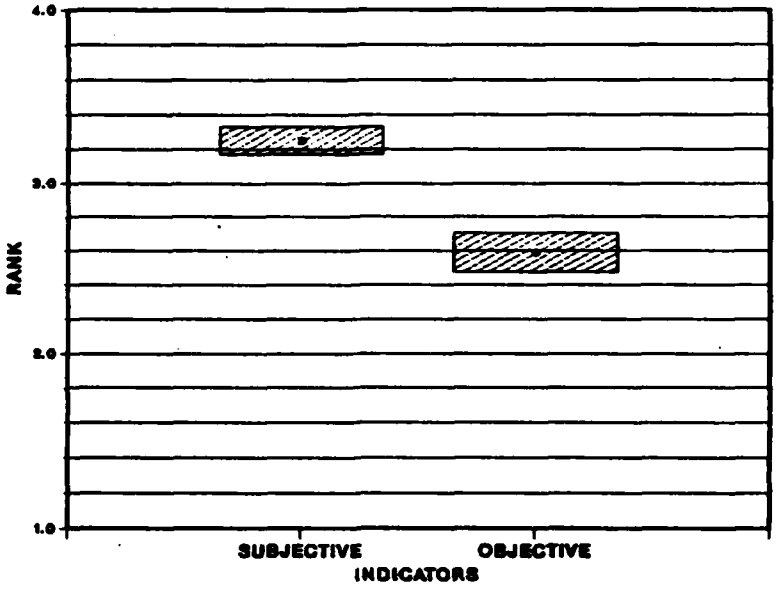


Figure 4-5. Rank Means and 99 Percent Confidence Intervals by All Supervisors

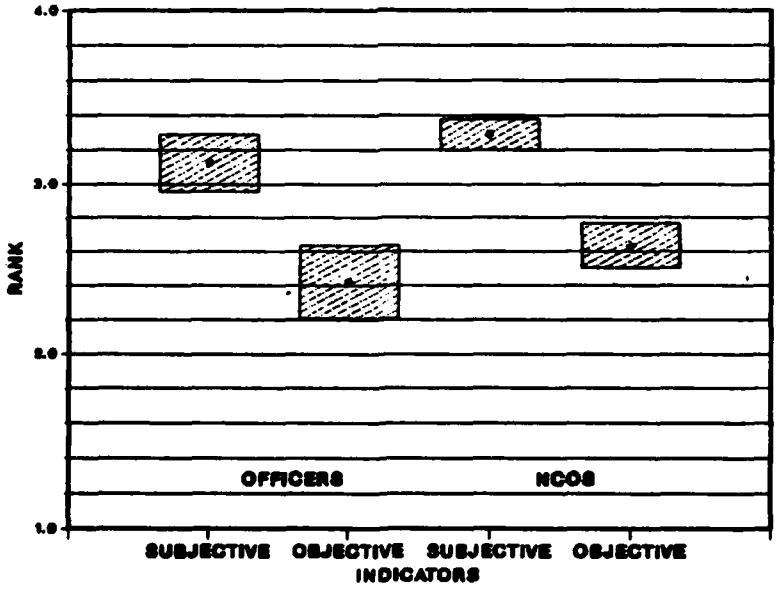


Figure 4-6. Rank Means and 99 Percent Confidence Intervals by Officers and NCOs

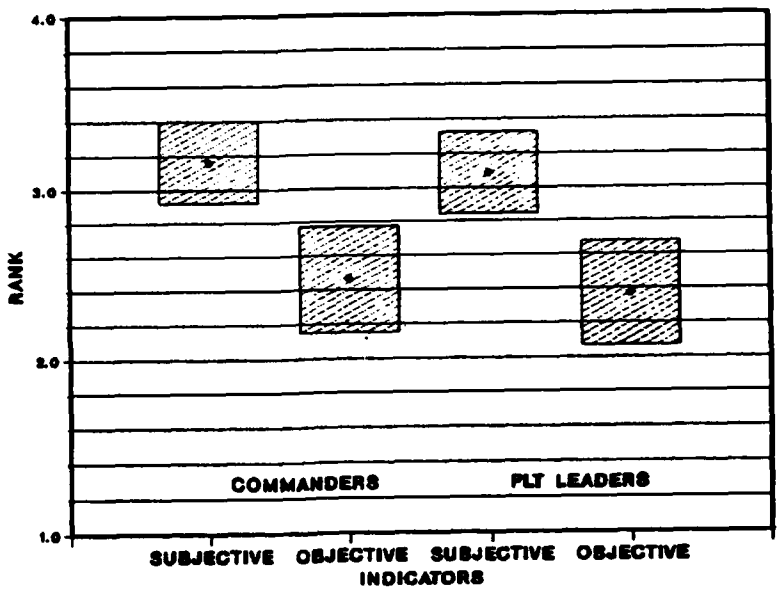


Figure 4-7. Rank Means and 99 Percent Confidence Intervals by Commanders and Platoon Leaders

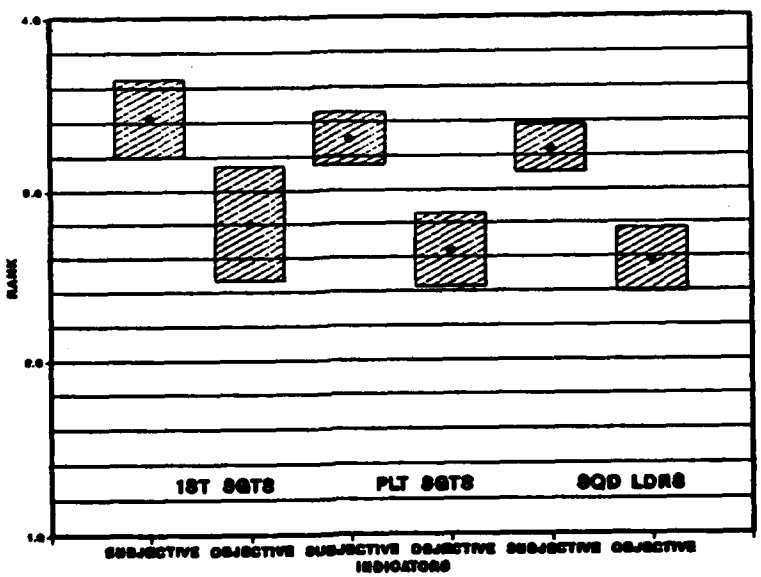


Figure 4-8. Rank Means and 99 Percent Confidence Intervals by First Sergeants, Platoon Sergeants, and Squad Leaders

2. Figure 4-7 shows a comparison of the two officer levels of supervision (commanders and platoon leaders). Again, each level ranks the subjective indicators significantly higher than the objective indicators. Also, no difference is discerned between the two levels in their rankings of the subjective indicators or in their rankings of the objective indicators. Figure 4-8 shows a comparison of the three levels of NCO supervisors. Their average rankings are consistent with those of the officers. Each of the three NCO supervisory levels ranks the subjective indicators significantly higher than the objective indicators, and, as with the officers, there is no significant difference among the three NCO levels in their average rankings of the subjective indicators or in their average rankings of the objective indicators.

3. In summary, all supervisors ranked the subjective indicators significantly higher than they ranked the objective indicators, and there is no evidence of inconsistent rankings of the indicators among the supervisors.

(b) Nonparametric Tests

1. Indicator Rankings. The rank means in Table 4-3 were next subjected to a nonparametric test to verify the conclusions of the previous section. The two-sample Kolmogorov-Smirnov (KS) test was used to test equality of the distributions of objective and subjective rank means. Let:

$F(X)$ = the theoretical cumulative distribution function (cdf) of the objective indicator rank means,

$F(W)$ = the theoretical cumulative distribution function (cdf) of the subjective indicator rank means,

$S(X)$ = the empirical cumulative distribution function (cdf) of the objective indicator rank means,

$S(W)$ = the empirical cumulative distribution function (cdf) of the subjective indicator rank means.

The test is based on the largest vertical deviation between $S(X)$ and $S(W)$. The test statistic is:

$$D_{max} = \text{Max} \, | S(X) - S(W) | \, .$$

The null hypothesis, H_0: $F(X) = F(W)$, is tested against the alternative hypothesis, H_1: $F(X) \neq F(W)$. If $D_{max} \geq D_{1-\alpha}$, the tabulated critical value, reject H_0 at the α-level of significance. For $n_1 = 9$ and $n_2 = 11$

(9 subjective indicator rank means and 11 objective indicator rank means), $D_{0.99} \approx 0.67$. Figures 4-9 through 4-16 are the pairs of cdfs corresponding to the eight column headings in Table 4-3. For example, Figure 4-9 shows S(X) and S(W) for all 832 supervisors and Figure 4-10 shows S(X) and S(W) for the 188 officers. In all eight figures, $D_{max} > 0.67$. Therefore, H_0: F(X) = F(W) is rejected in favor of H_1:F(X) ≠ F(W). A further examination of Figures 4-9 through 4-16 shows that in all cases S(W) dominates S(X). That is, the cdfs of the subjective indicators are consistently shifted to the right of the cdfs of the objective indicators. Therefore, it is concluded that not only is F(X) ≠ F(W), but that F(W) > F(X). That is, one may state with at least 99 percent confidence that the distributions of subjective indicator rank means are significantly larger (shifted to the right) than the distributions of the objective indicator rank means.

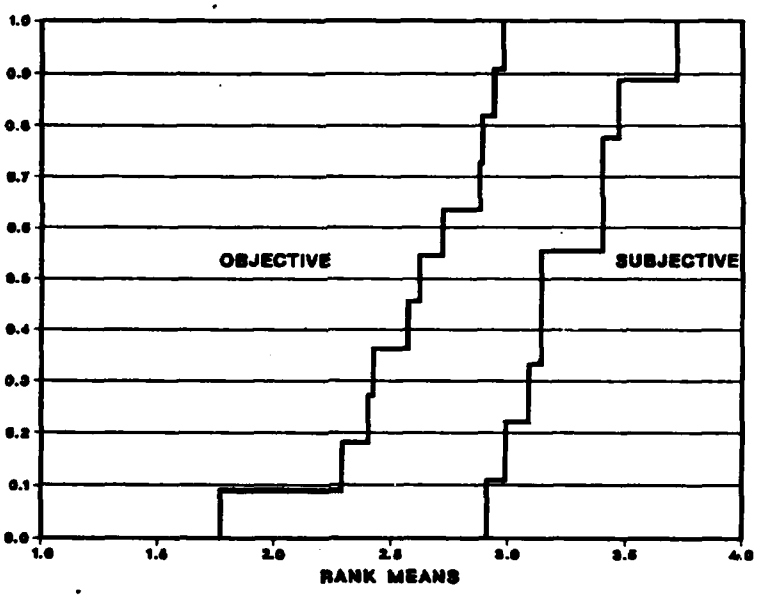


Figure 4-9. Cdf of All Rankings (objective vs subjective)

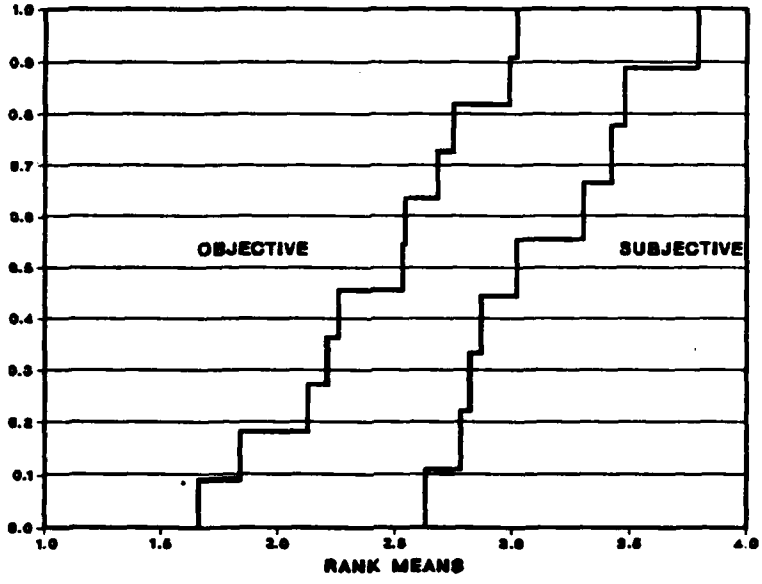


Figure 4-10. Cdf of Officer Rankings (objective vs subjective)

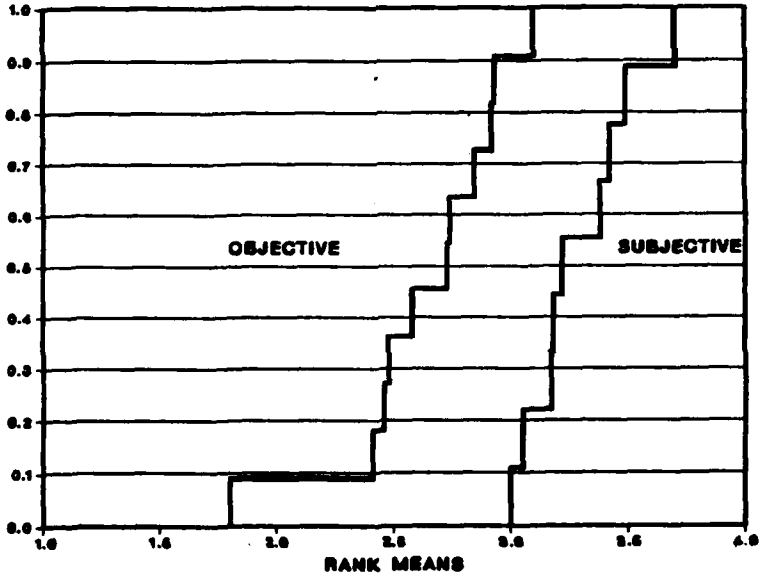


Figure 4-11. Cdf of NCO Rankings (objective vs subjective)

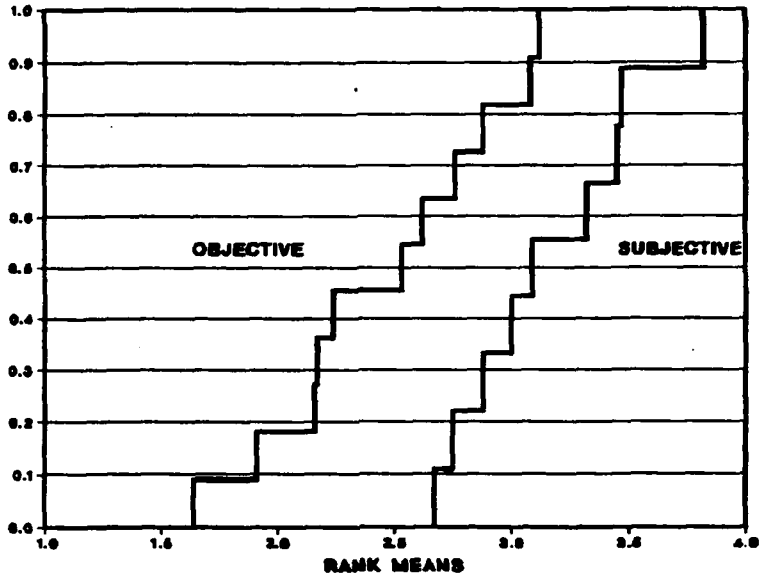


Figure 4-12. Cdf of Commander Rankings (objective vs subjective)

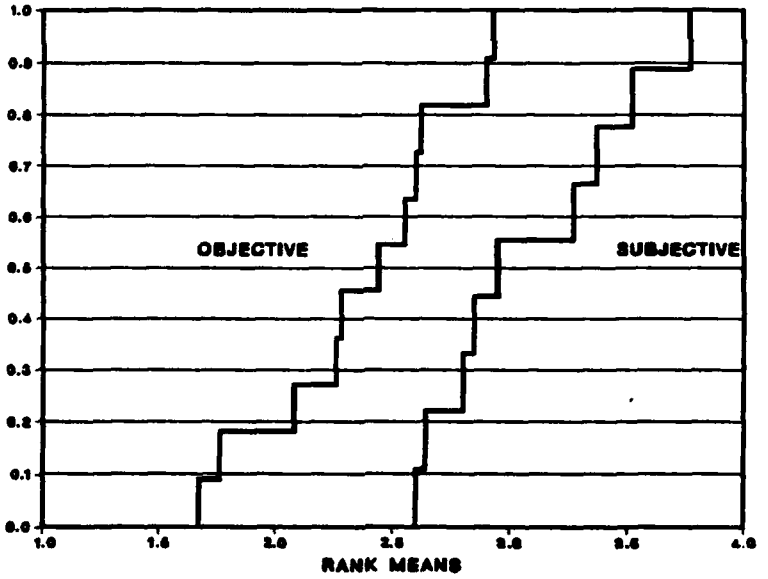


Figure 4-13. Cdf of Platoon Leader Rankings (objective vs subjective)

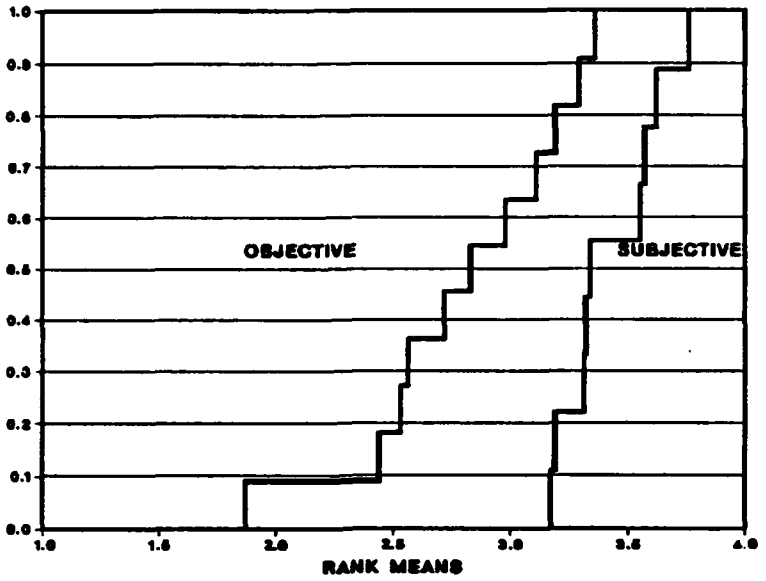


Figure 4-14. Cdf of First Sergeant Rankings (objective vs subjective)

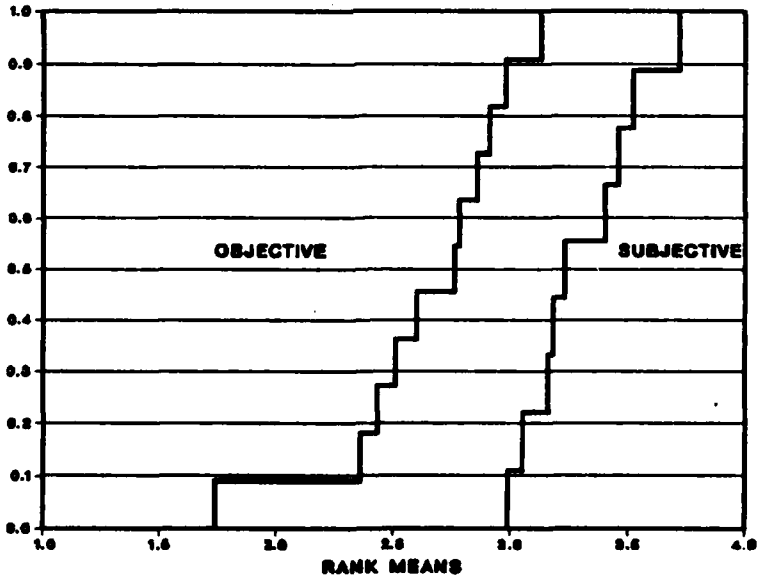


Figure 4-15. Cdf of Platoon Sergeant Rankings (objective vs subjective)

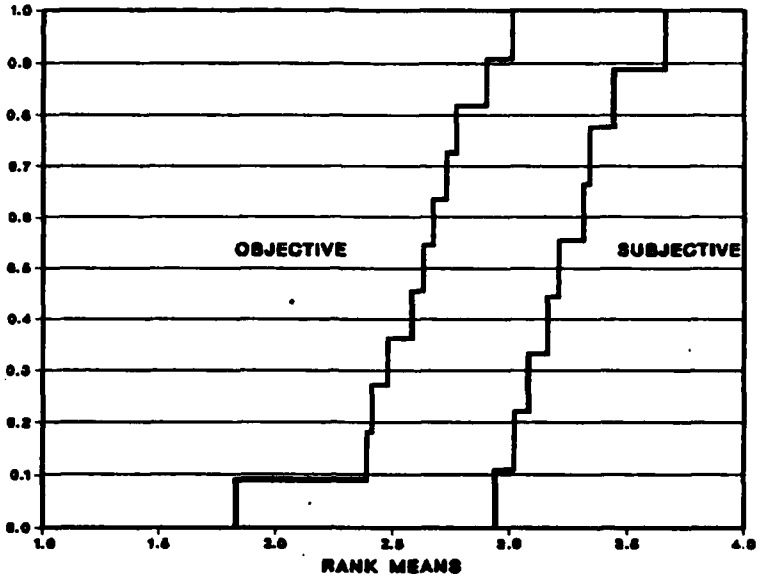


Figure 4-16. Cdf of Squad Leader Rankings (objective vs subjective)

2. Supervisory Rankings. Next, the KS-test was used to test equality between the distributions of supervisors' rankings. Comparisons were made within the objective indicators and within the subjective indicators. For the objective indicators $n_1 = n_2 = 11$ and $D_{0.99} \approx 0.67$; for the subjective indicators, $n_1 = n_2 = 9$ and $D_{0.99} \approx 0.64$. In each of the Figures 4-17 through 4-20, D_{max} is less than 0.67. These figures show comparisons of the objective indicator rankings for:

a. Officers versus NCOs.

b. Commanders versus platoon leaders.

c. First sergeants versus platoon sergeants.

d. Platoon sergeants versus squad leaders.

Figures 4-21 through 4-24 show the same four pairings for the subjective indicators. None of the D_{max}-values are equal to or greater than 0.64. Therefore, there is no evidence that the rankings of the indicators are different among supervisors. This is consistent with the conclusion from the analysis in paragraph 4-2c(2)(a), above.

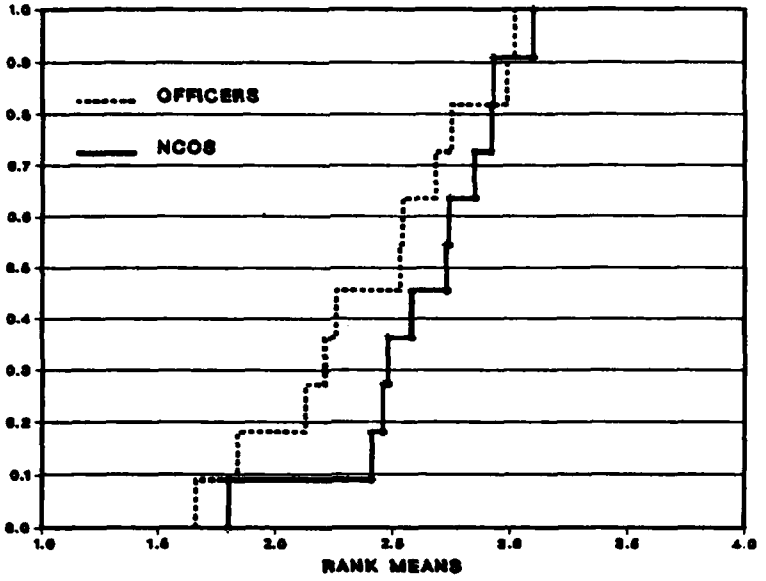


Figure 4-17. Cdf of Officers vs NCOs (objective)

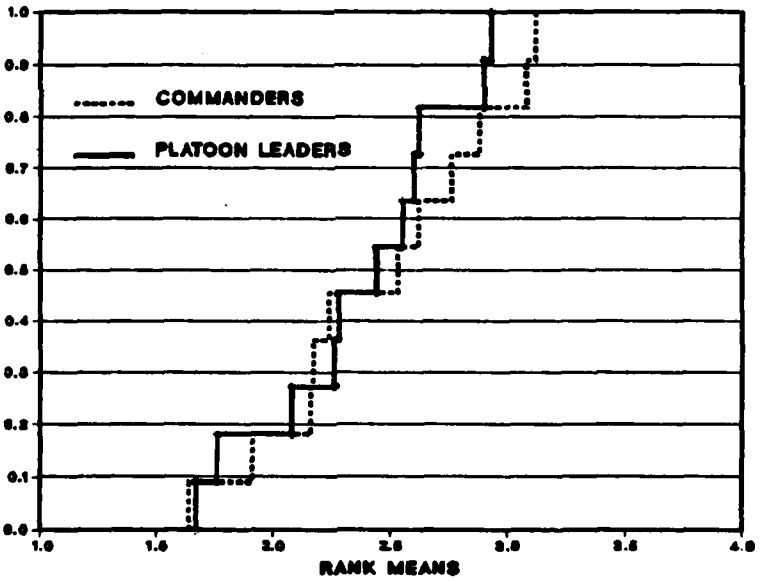


Figure 4-18. Cdf of Commanders vs Platoon Leaders (objective)

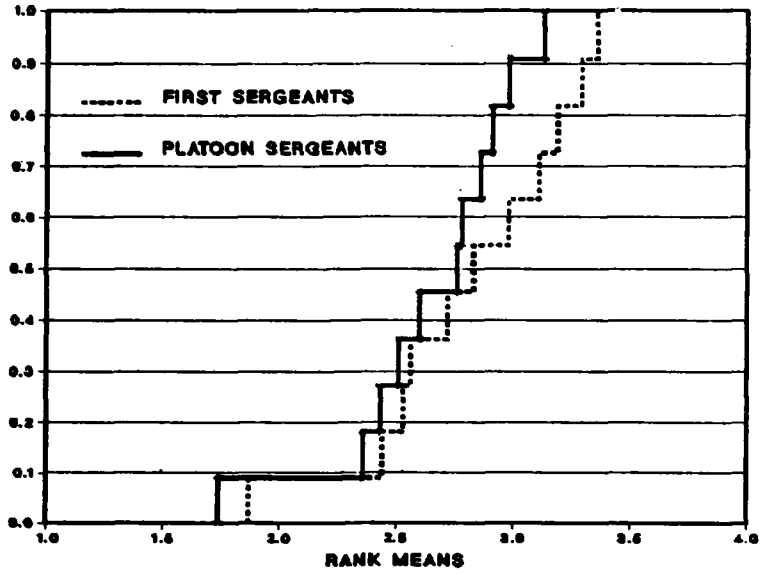


Figure 4-19. Cdf of First Sergeants vs Platoon Sergeants (objective)

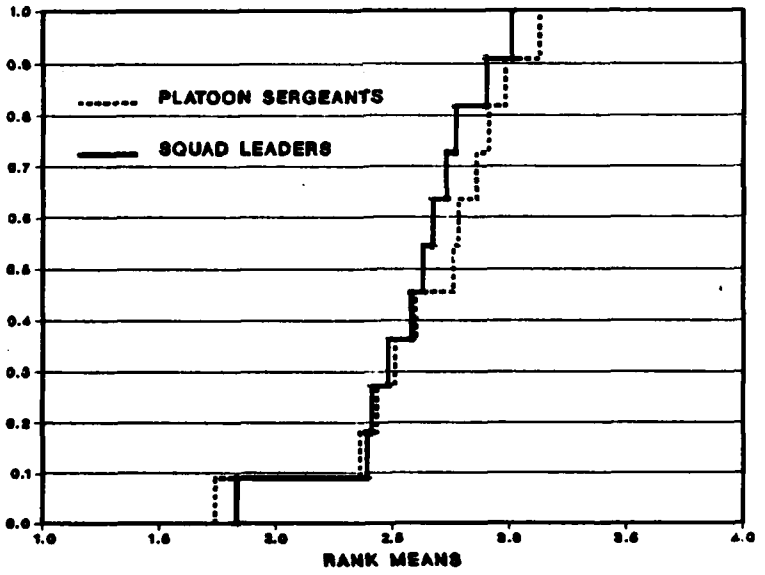


Figure 4-20. Cdf of Platoon Sergeants vs Squad Leaders (objective)

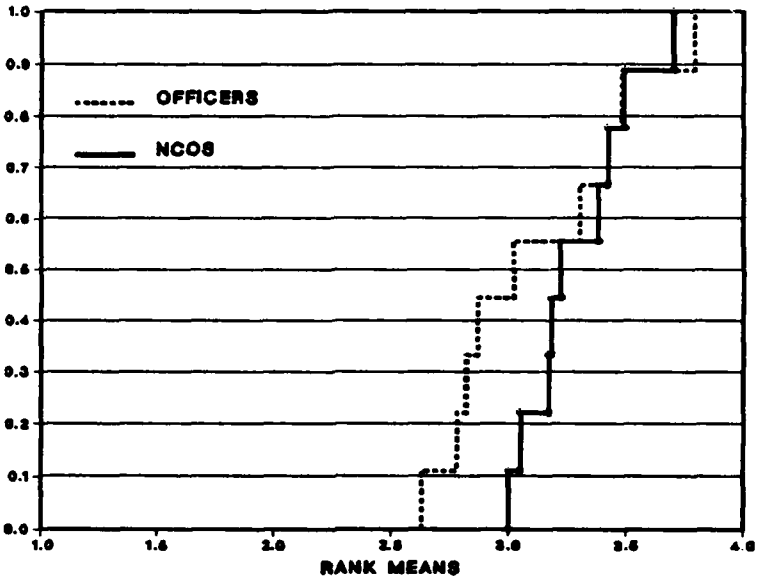


Figure 4-21. Cdf of Officers vs NCOs (subjective)

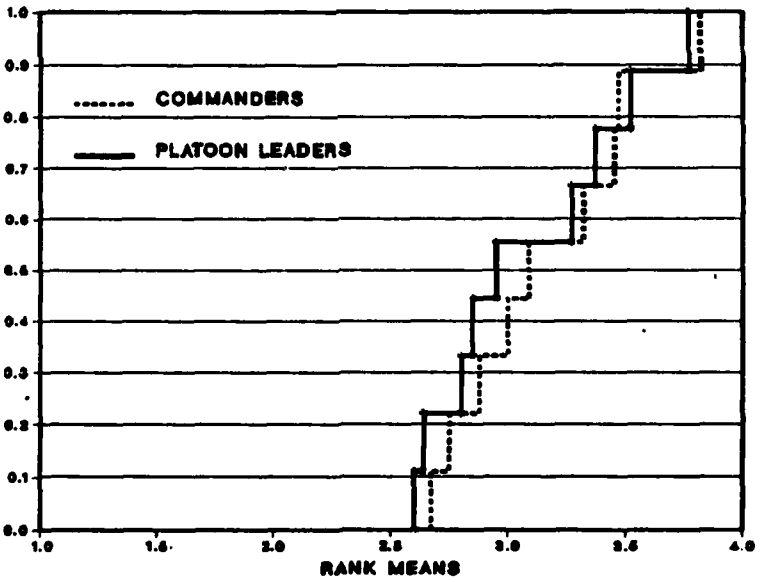


Figure 4-22. Cdf of Commanders vs Platoon Leaders (subjective)

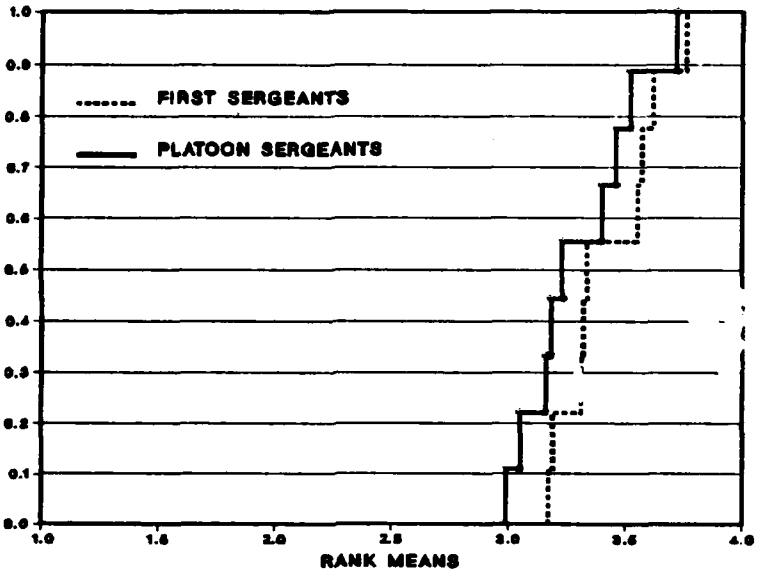


Figure 4-23. Cdf of First Sergeants vs Platoon Sergeants (subjective)

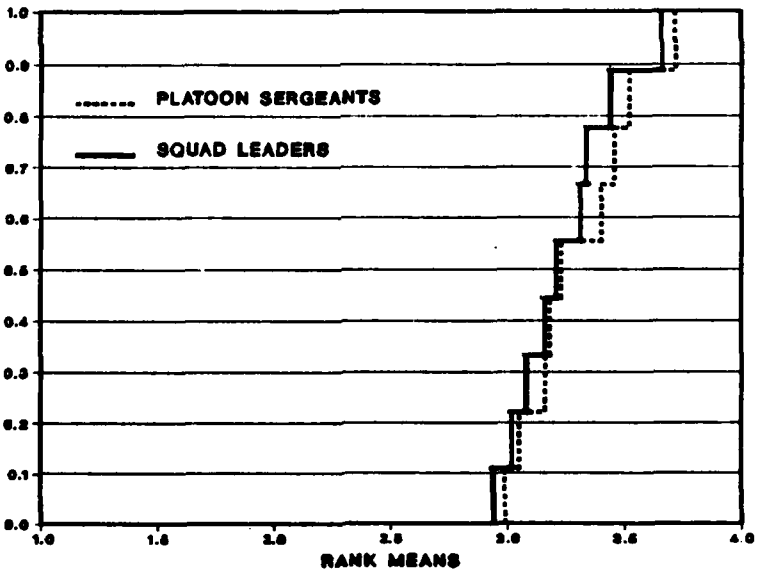


Figure 4-24. Cdf of Platoon Sergeants vs Squad Leaders (subjective)

(c) Correlations. The final analysis on comparison of the supervisors' rankings of indicators was testing the correlations of the rank means in Table 4-3 between various supervisory levels. Correlations were calculated for all 20 indicators, for only the 11 objective indicators, and for only the 9 subjective indicators. The critical r-values for the $\alpha = 0.01$ level of significance for sample sizes 20, 11, and 9 are 0.52, 0.68, and 0.75, respectively. The calculated correlations are tabulated in Table 4-5. It can be observed that the correlations range from 0.82 to 0.98, and all are significantly larger than zero. That is, the null hypothesis of no correlation between supervisors' rankings of the indicators can be rejected at the $\alpha = 0.01$ level of significance. Therefore, it is concluded as before that there is no evidence that supervisors are not consistent in their rankings of the indicators. To conserve space, plots of all 15 correlations tabulated in Table 4-5 are not shown. The three correlations (0.92, 0.82, and 0.96) in the first row between officers and noncommissioned officers are graphically illustrated in Figures 4-25 through 4-27.

Table 4-5. Correlation Between Supervisors' Rankings of Indicators

Supervisors	Indicators		
	All	Objective	Subjective
1. Officer vs noncommissioned officer	0.92	0.82	0.96
2. Commander vs platoon leader	0.98	0.98	0.95
3. First sergeant vs platoon leader	0.98	0.97	0.98
4. First sergeant vs squad leader	0.95	0.93	0.95
5. Platoon sergeant vs squad leader	0.98	0.97	0.97

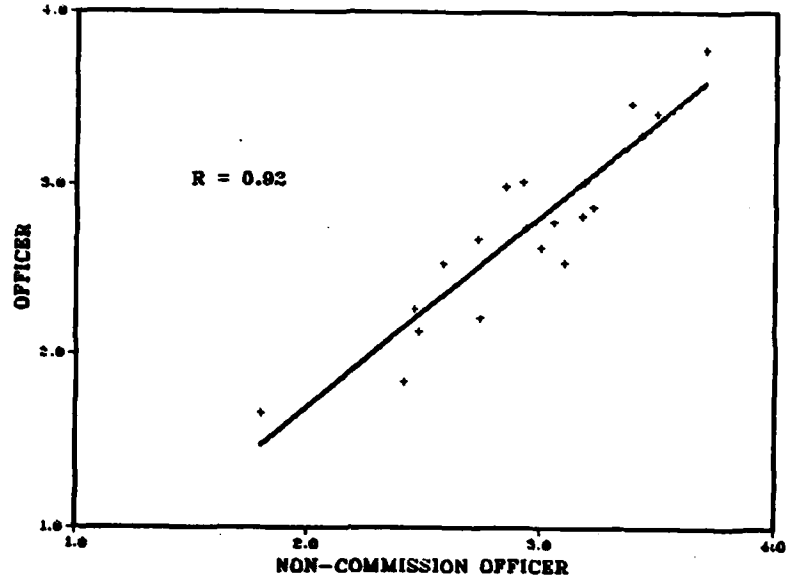


Figure 4-25. Correlation of Officer and NCO Indicator Rankings (all)

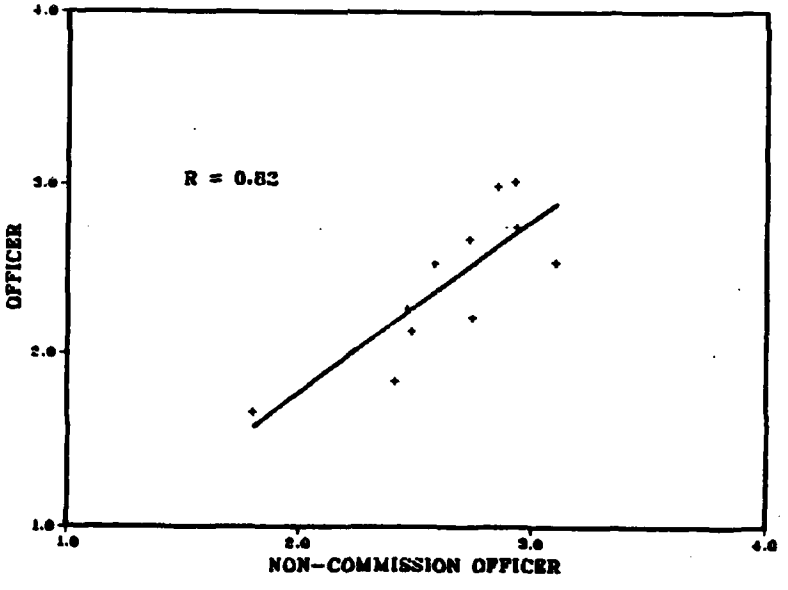


Figure 4-26. Correlation of Officer and NCO Indicator Rankings (objective)

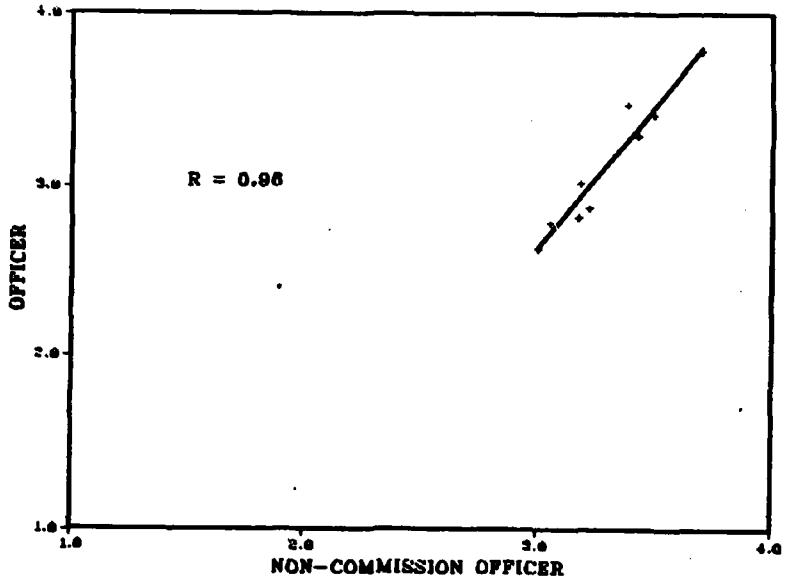


Figure 4-27. Correlation of Officer and NCO Indicator Rankings (subjective)

d. Conclusions. The above analyses revealed no evidence in the data of inconsistent rankings of the indicators among the supervisors. However, the analyses did reveal evidence that the objective indicator rank means are significantly lower than the subjective indicator rank means. Supervisors (both officers and NCOs) clearly attach greater importance to the subjective indicators than to the objective indicators.

4-3. SUBJECTIVE INDICATOR SCORING

a. Description of Data. The data for scoring the nine subjective indicators came from Part II of the questionnaire. Unit supervisors were directed in this part to subjectively rate, on a numerical scale of 0 to 100, first-term soldiers on each of the nine subjective indicators. The score given to a first-term soldier on a particular subjective indicator represented the perception by a unit supervisor of the degree to which that soldier displayed the traits that the supervisor associated with that indicator. The higher the score for a particular indicator, the better a given first-term soldier's quality was perceived by a supervisor in relation to that indicator.

b. Quality and Quantity of Data. The same comments made about the quality of data on the rankings (paragraph 4-2b) also apply to the quality of the data on the subjective indicators. The quantity of data pertaining to the subjective indicators which was used for analysis consisted of 2,501 complete data sets. These complete sets represented the subjective ratings given by 832 different unit supervisors to a total of 823 first-term soldiers on the nine subjective indicators. Incomplete data sets (sets with one or more missing indicator scores on the subjective indicators) were not used.

c. Analysis. As stated in paragraph 4-1c(2), above, plots of data on all 20 of the indicators versus observed overall quality estimates were studied prior to performing the regression analysis. Figures 4-28 through 4-36 contain plots of unit supervisors' ratings on first-term soldiers for each of the nine subjective indicators versus overall quality as estimated by unit supervisors. The indicator rating is the abscissa and estimated overall quality is the ordinate. An asterisk denotes a single point; a numeral denotes the number of points at the particular coordinate. The correlation of the two variables is also shown on each figure. All correlations are seen to be positive and high (0.77 to 0.86). All figures illustrate a strong linear association between the independent variables (subjective indicators) and the dependent variable (estimated overall quality).

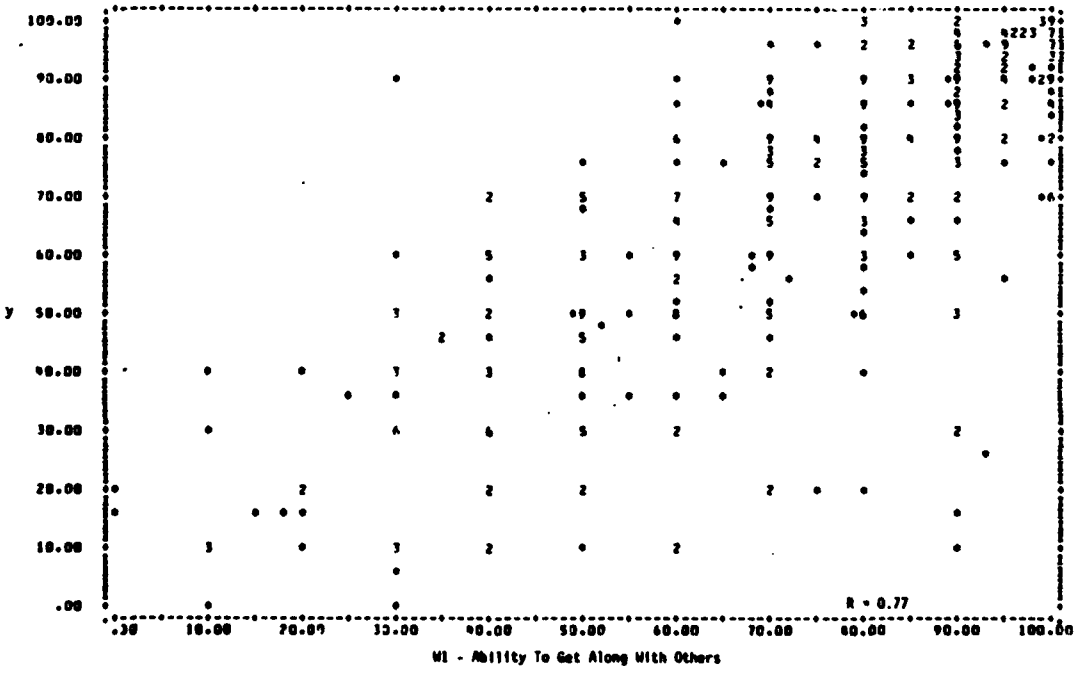


Figure 4-28. Estimated Overall Quality vs Ability to Get Along with Others

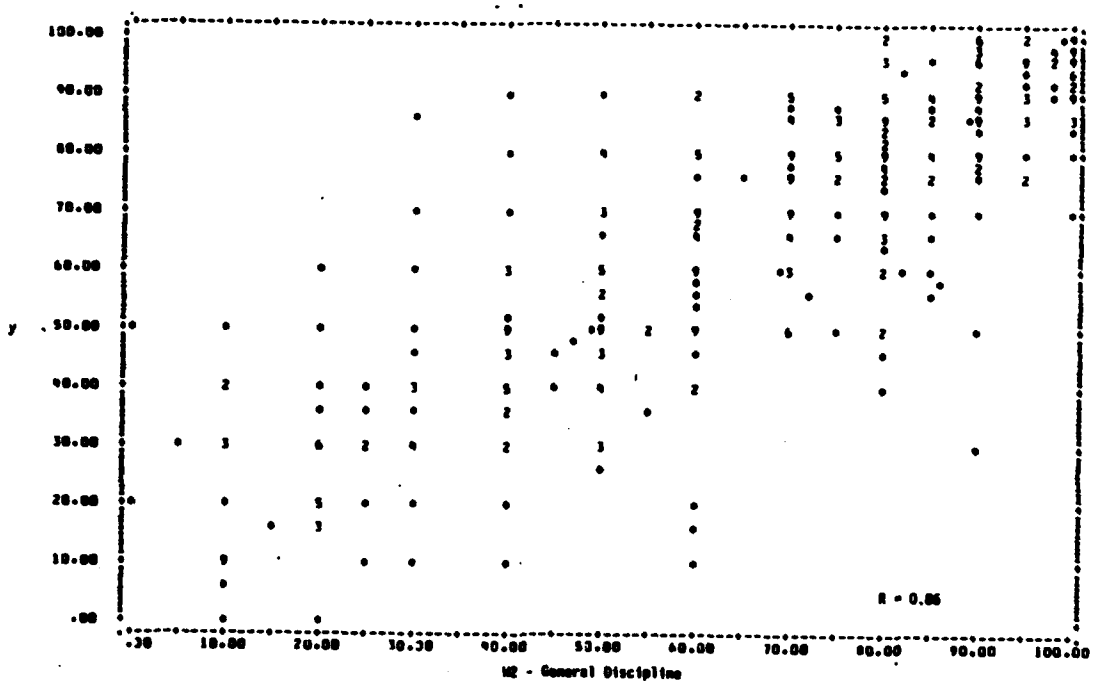


Figure 4-29. Estimated Overall Quality vs General Discipline

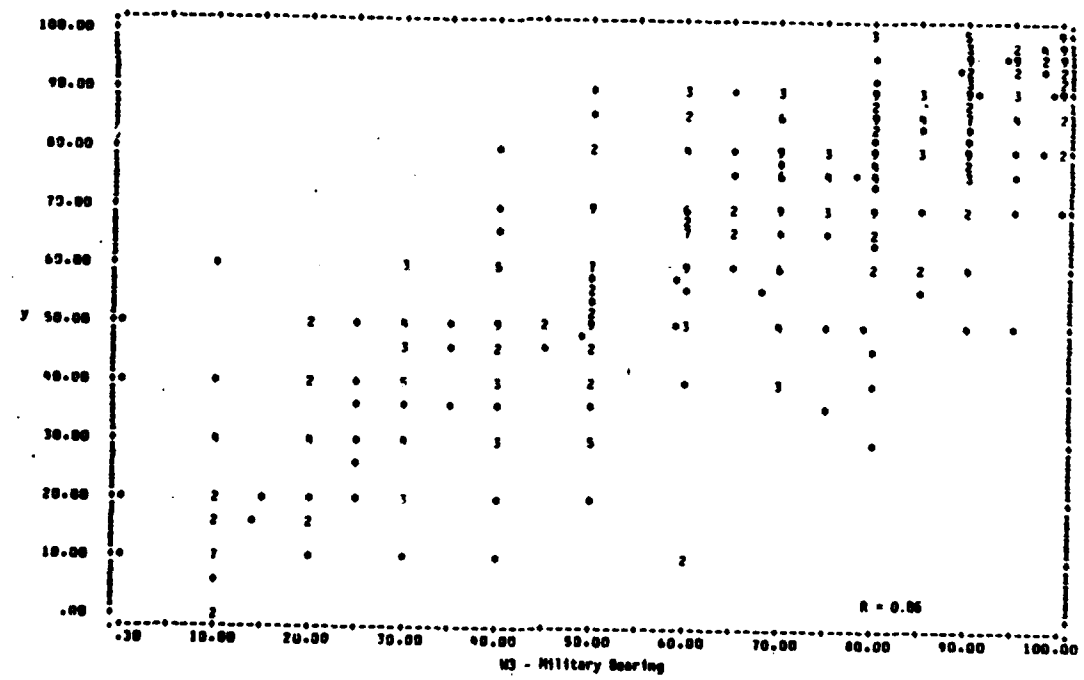


Figure 4-30. Estimated Overall Quality vs Military Bearing

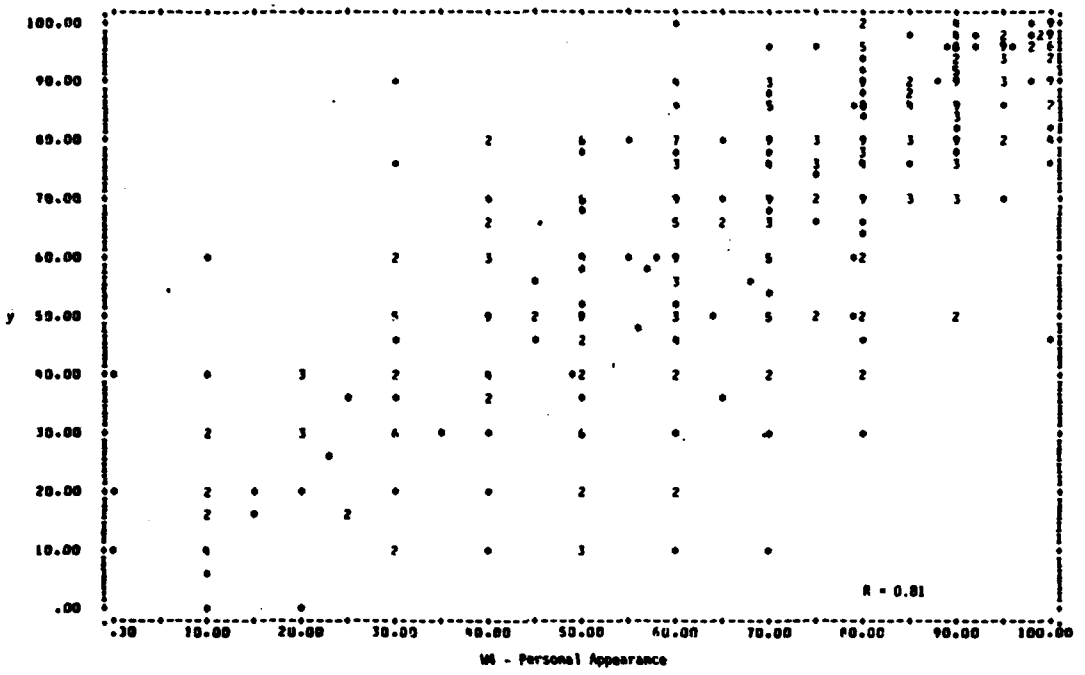


Figure 4-31. Estimated Overall Quality vs Personal Appearance

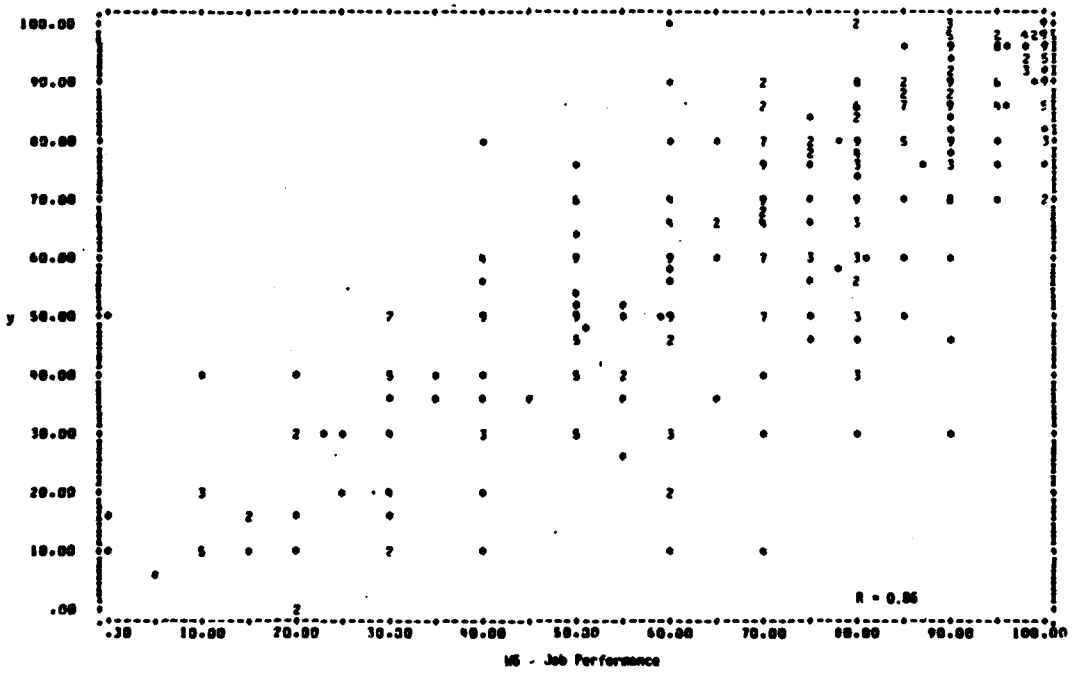


Figure 4-32. Estimated Overall Quality vs Job Performance

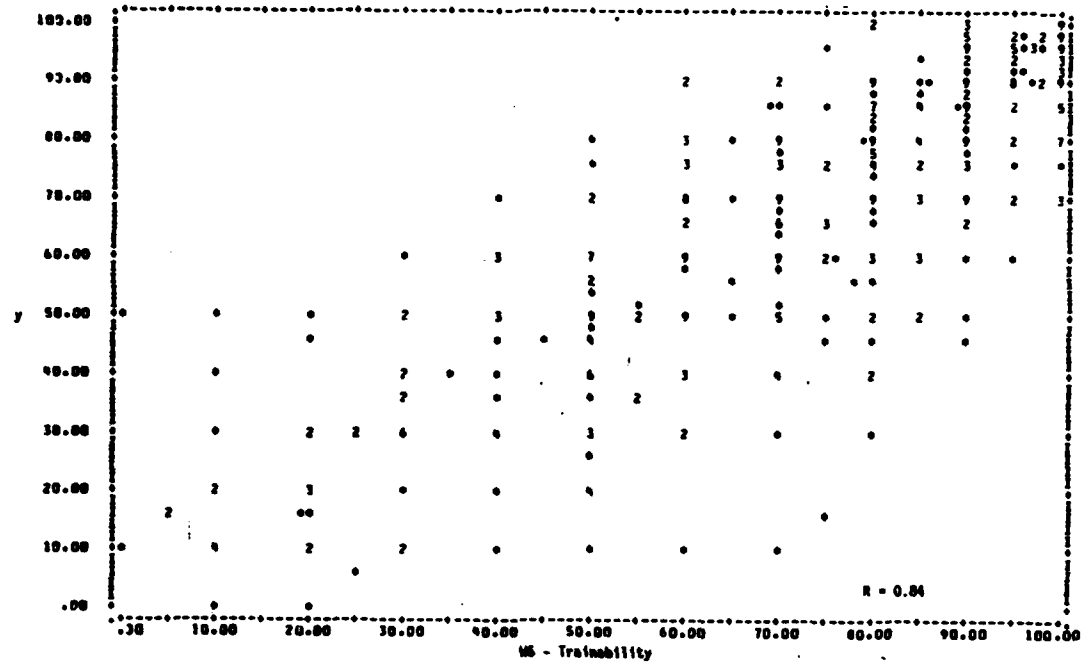


Figure 4-33. Estimated Overall Quality vs Trainability

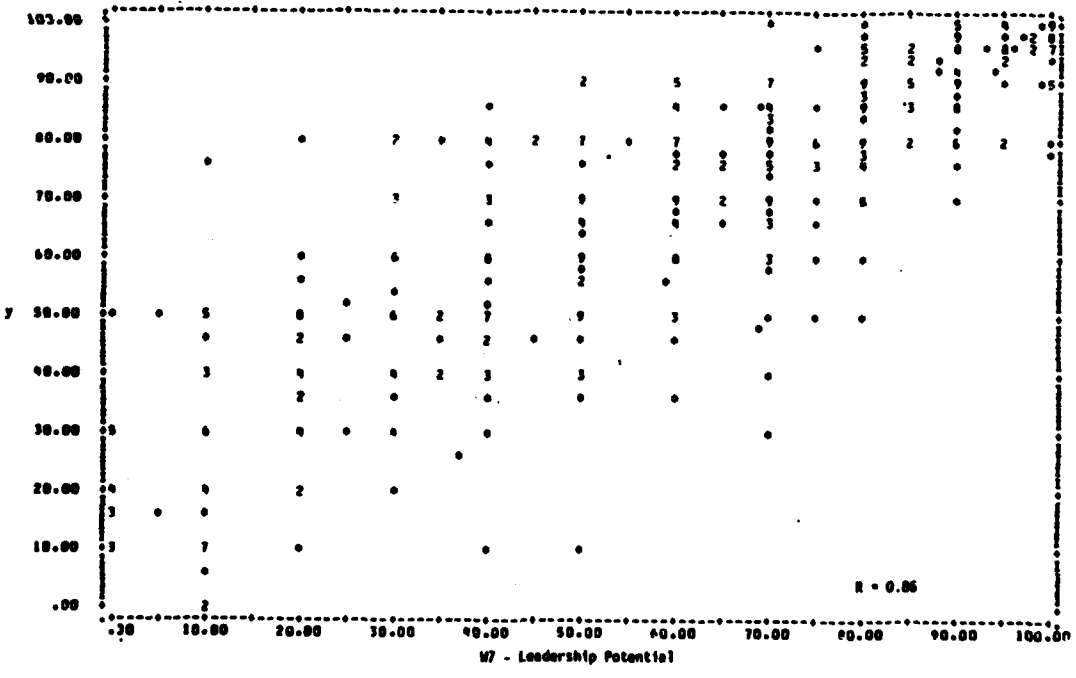


Figure 4-34. Estimated Overall Quality vs Leadership Potential

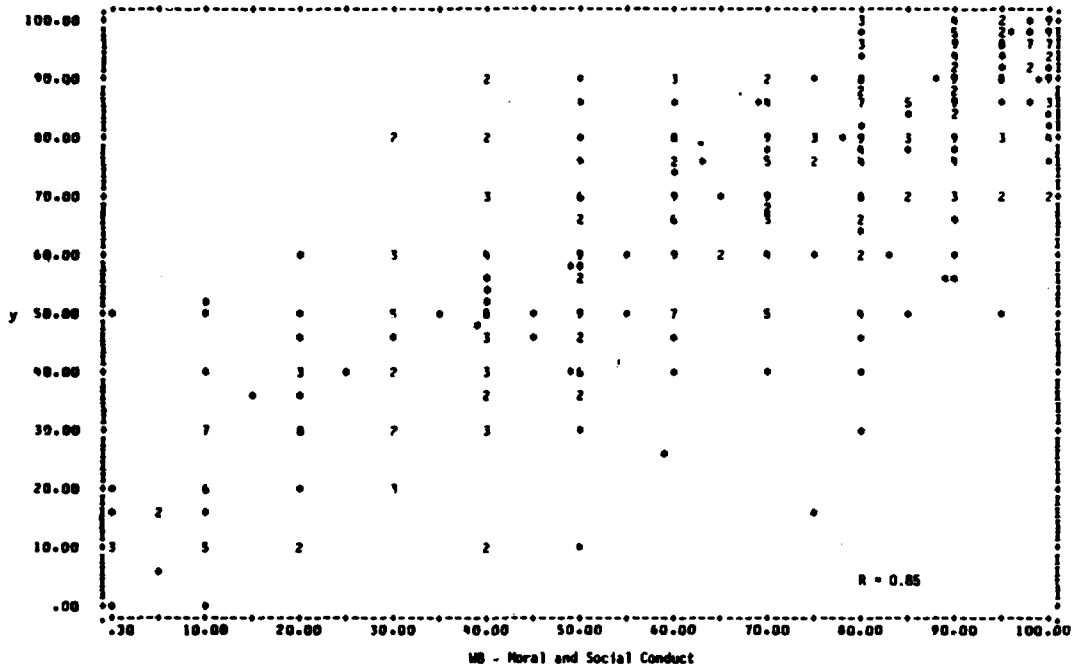


Figure 4-35. Estimated Overall Quality vs Moral and Social Conduct

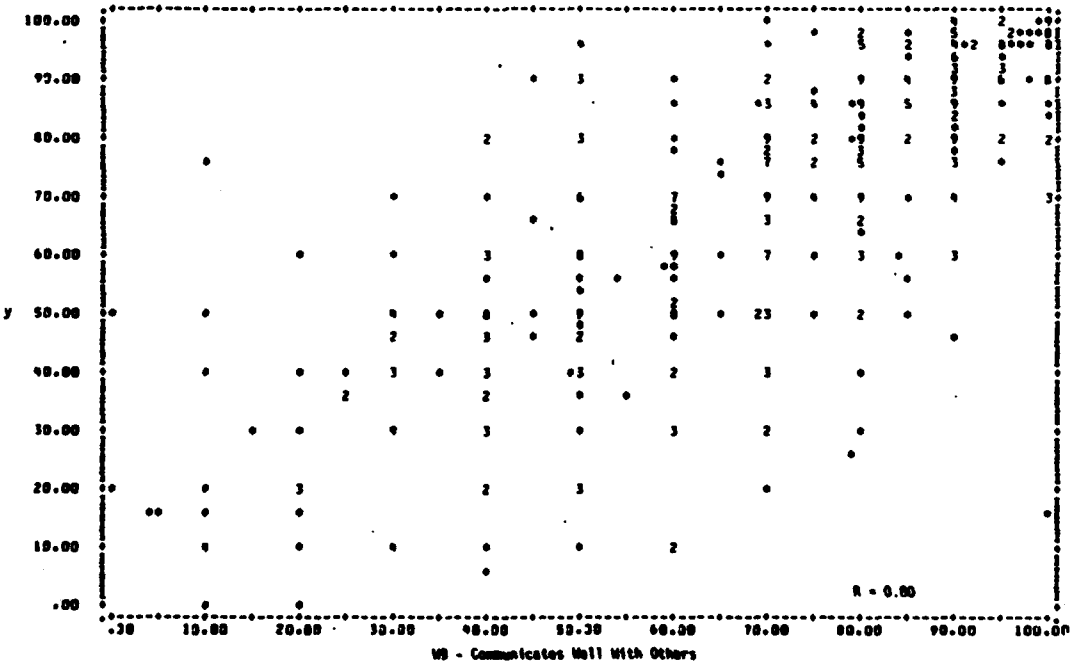


Figure 4-36. Estimated Overall Quality vs Communicates Well with Others

d. Conclusions

(1) There is a strong linear association between ratings of first-term soldiers by supervisors on the subjective indicators and overall quality as perceived by the same unit supervisors.

(2) Based upon the strong linear association between the subjective indicators and estimated overall quality, and in the absence of any other obvious functional relationship, a large percentage of the variability in estimated overall quality can apparently be accounted for by a multiple linear function of the subjective indicators.

4-4. OBJECTIVE INDICATOR SCORING

a. Data Sources. The data pertaining to the objective indicators consisted of quantitative data obtained from two sources. First, data were obtained from the EMF for four of the objective indicators (AFQT, CIVED, Rank, and Physical Profile). Secondly, data for the remaining seven objective indicators were obtained from the PDS filled out on each first-term soldier who was rated in the survey.

b. Description of Data. The numerical values used in the study for the 11 objective indicators came from either actual scores associated with four of the indicators (AFQT, SQT, PRS, and IWS), or scores assigned by the study team for the other seven indicators. Assigned scores for these latter indicators came from separate scoring ranges developed for each of the seven indicators. The scoring scale within each range was designed to score a given indicator on the basis of its worth in estimating quality of a first-term soldier. The higher the score value for a particular indicator, the better the quality of a given first-term soldier in terms of that indicator. The scoring ranges for the seven indicators were selected to cover all possible conditions which were expected to be found pertaining to the association of these indicators with first-term soldiers.

c. Quality and Quantity of Data. The quality of the data was not as good as the data obtained on the indicator rankings and the subjective indicator scores. Incomplete or erroneous data were found on both the EMF and the PDSs. Data which were suspect were either corrected or not used. Entries on the PDSs were sometimes illegible, and if so, were not used. Because of these deficiencies, the data pertaining to the objective indicators which were used in the regression analyses depended on both the quantity and quality of data obtained on each indicator. First, a total of 164 sets of data were analyzed which included scores for all 11 objective indicators. This corresponds to a complete data set of all 11 indicators for 164 first-term soldiers. Secondly, analysis was conducted on sets of objective data which did not include the objective indicator, SQT. The reason for conducting this second analysis was that the data obtained from

the survey showed that very few of the 823 first-term soldiers who were rated by supervisors had either taken the SQT, or if taken, had the score recorded at either unit level or on the EMF. Therefore, it was decided to conduct a supplementary analysis on objective data sets without SQT scores in order to gain information on the other 10 objective indicators which would otherwise have been lost if only the 164 complete sets had been analyzed. (The results of the regression analyses on the two different sets of objective indicator data are given in paragraphs 4-5d(1)(b) and (c)).

d. Analysis. The objective indicator data did not exhibit the same relationship to overall quality as perceived by unit supervisors as did the subjective indicator data. The objective indicator relationships are shown in Figures 4-37 through 4-47. The correlations of the objective indicators with estimated overall quality ranged from 0.008 for X1 (AFQT) to 0.480 for X11 (Article 15s). All correlations were less than any of the correlations of the subjective indicators. Only three indicators, X3 (Rank), X4 (Military Education), and X11 (Article 15s), had correlations greater than 0.20. The plots in these figures did not illustrate the presence of a strong linear association between the objective indicators and estimated overall quality, nor did they suggest the presence of either a curvilinear or other functional relationship between the objective indicators and estimated overall quality. Because no theoretical or empirical information existed on any relationship between the objective indicators and overall quality as perceived by unit supervisors, and because the data did not suggest any relationship, no transformations were performed on the data.

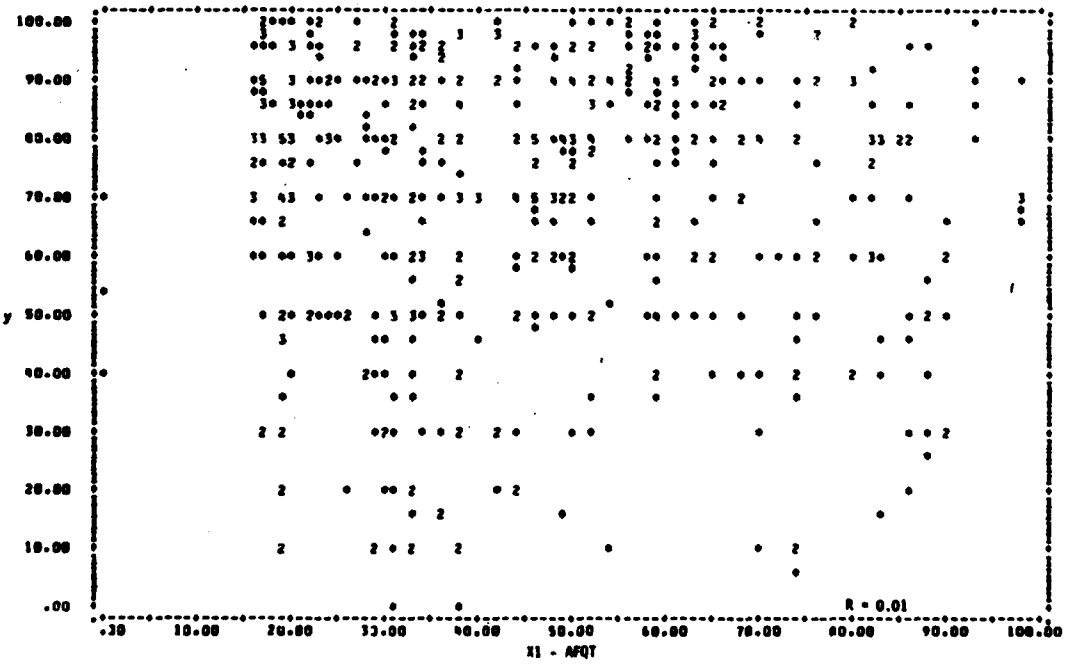


Figure 4-37. Estimated Overall Quality vs Armed Forces Qualification Test (AFQT)

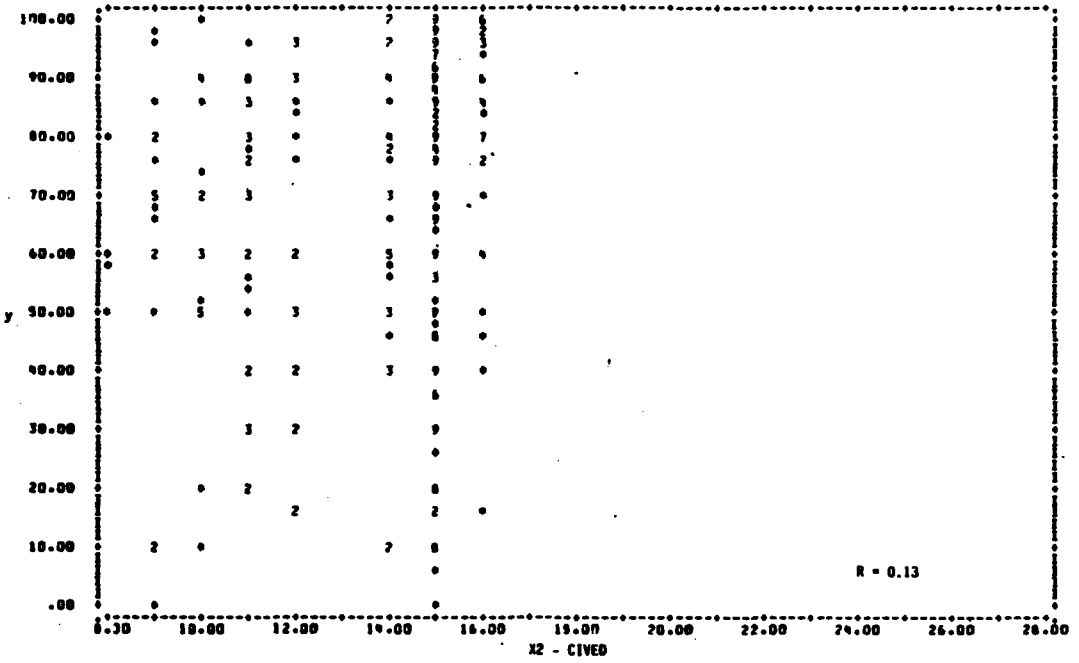


Figure 4-38. Estimated Overall Quality vs Civilian Education (CIVED)

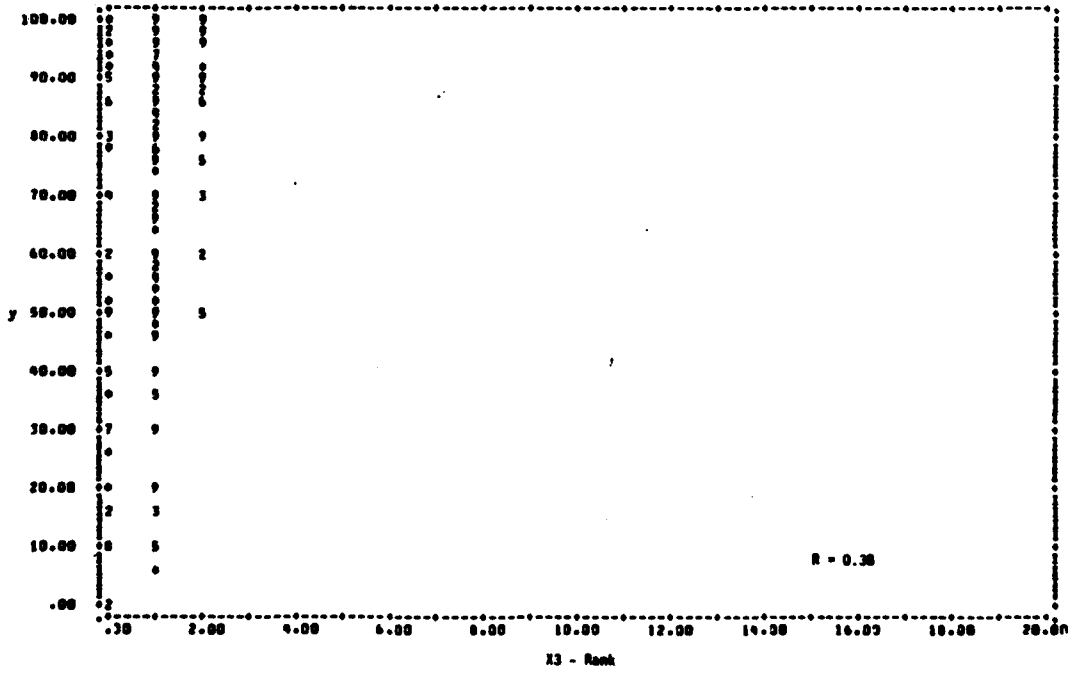


Figure 4-39. Estimated Overall Quality vs Rank

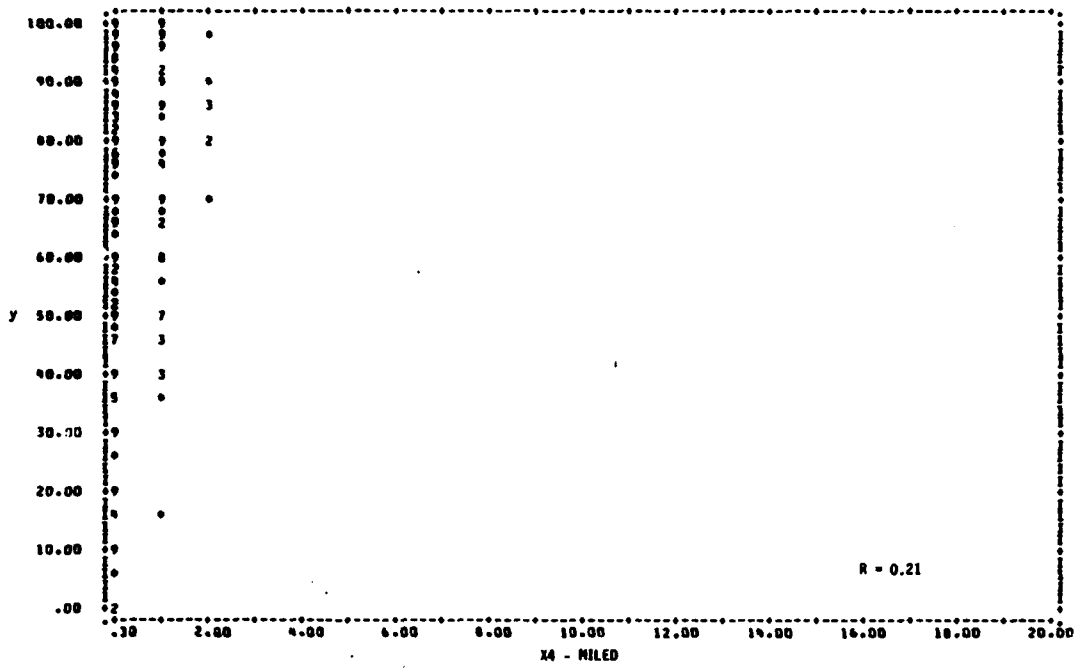


Figure 4-40. Estimated Overall Quality vs Military Education (MILED)

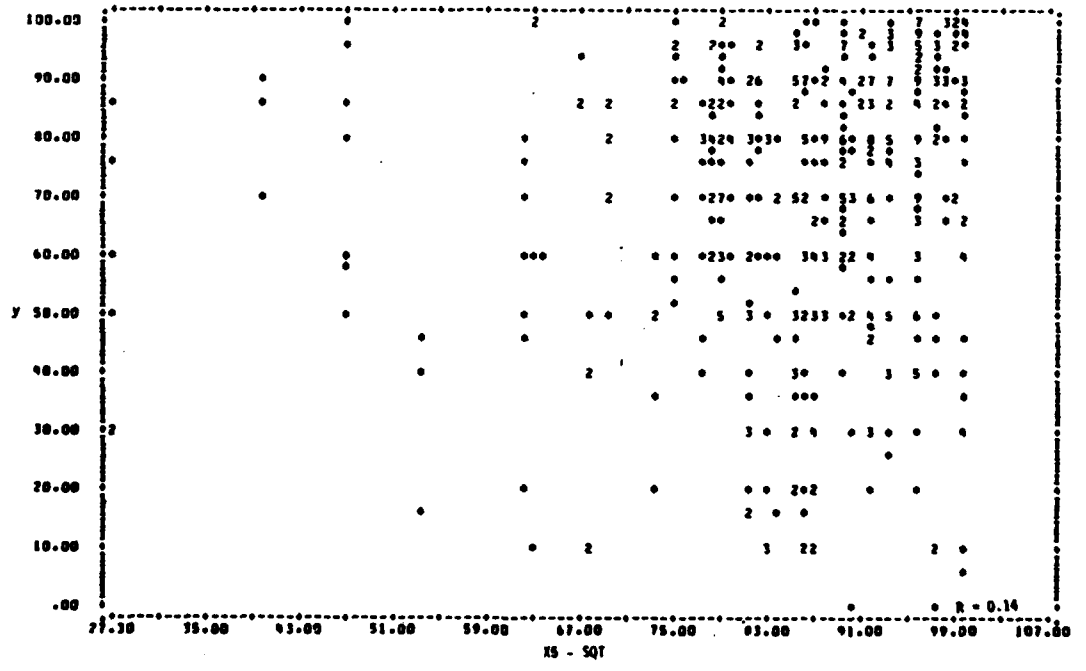


Figure 4-41. Estimated Overall Quality vs Skill Qualification Test (SQT)

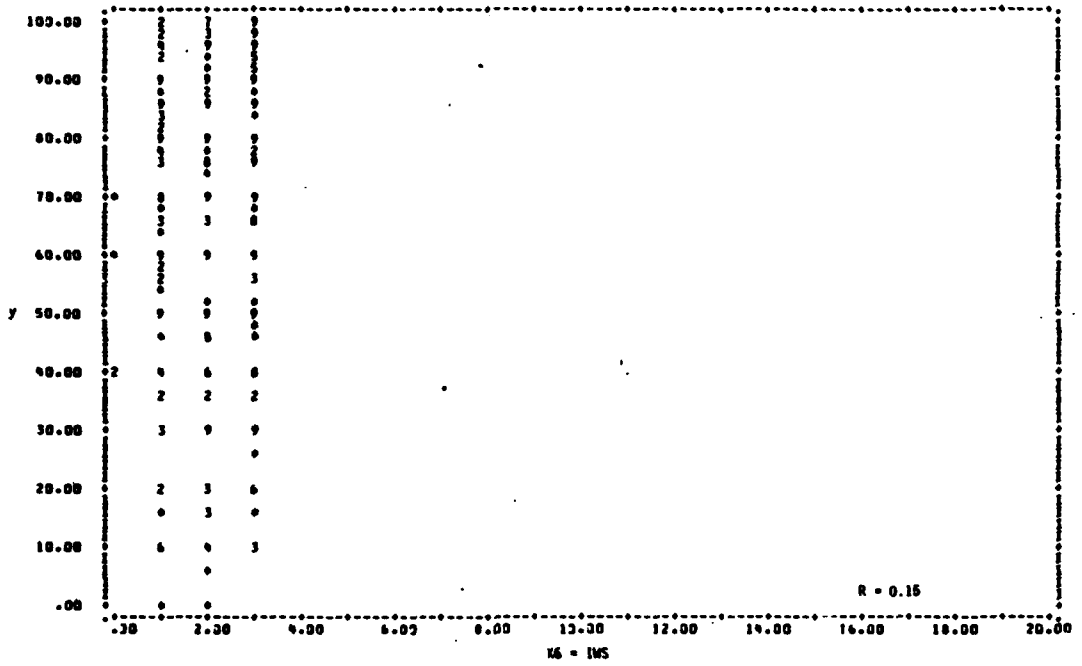


Figure 4-42. Estimated Overall Quality vs Individual Weapon Score (IWS)

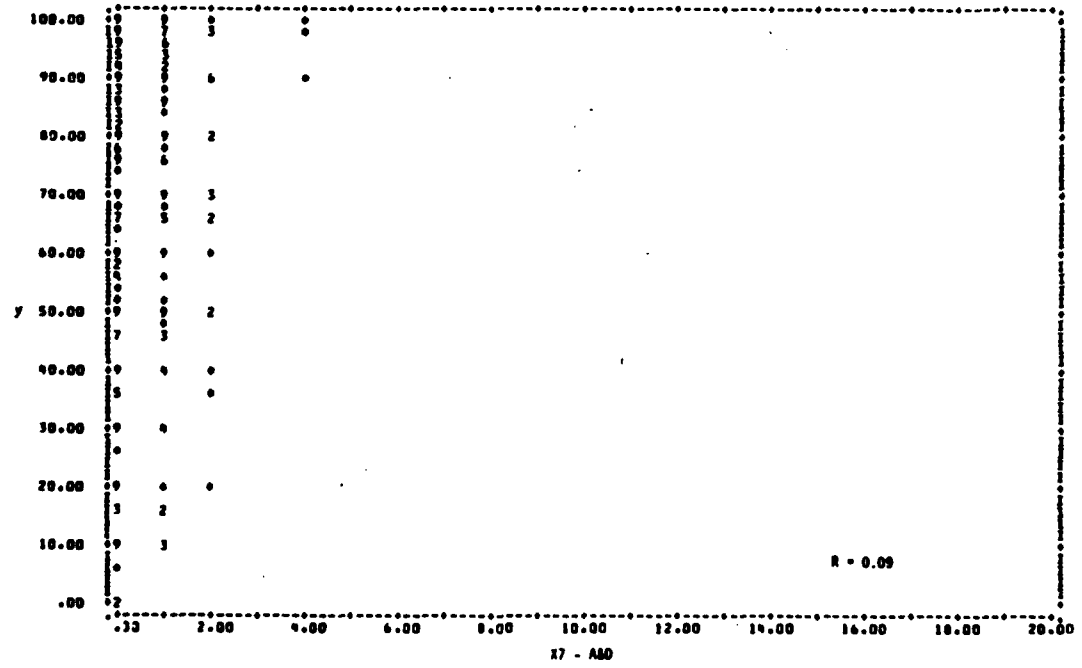


Figure 4-43. Estimated Overall Quality vs Awards & Decorations (A&D)

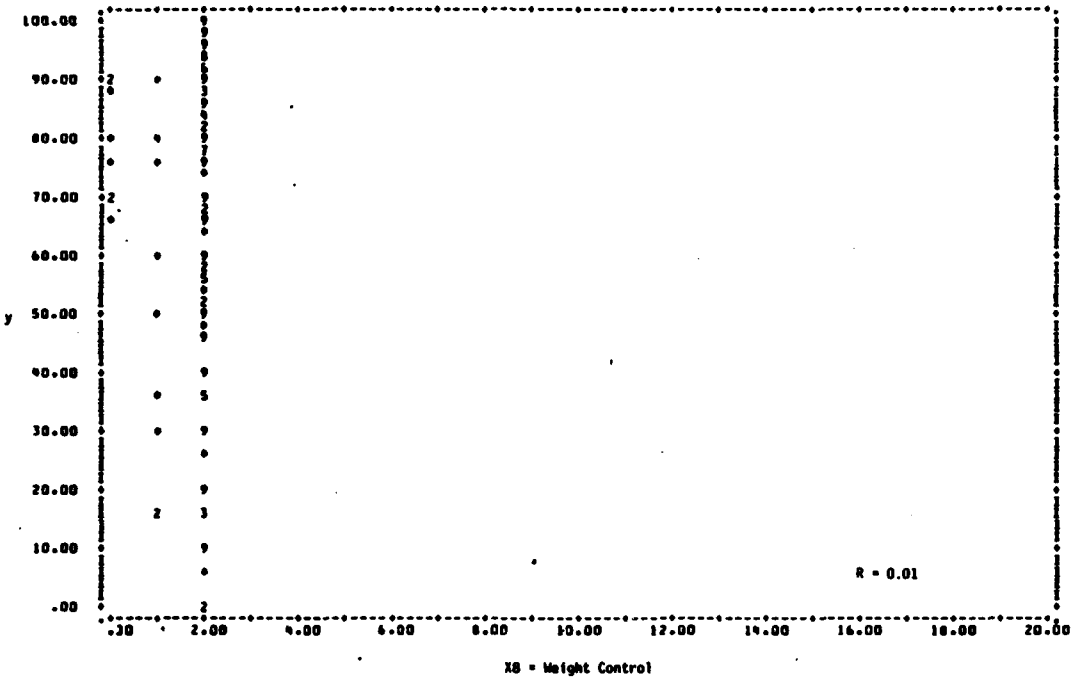


Figure 4-44. Estimated Overall Quality vs Weight Control

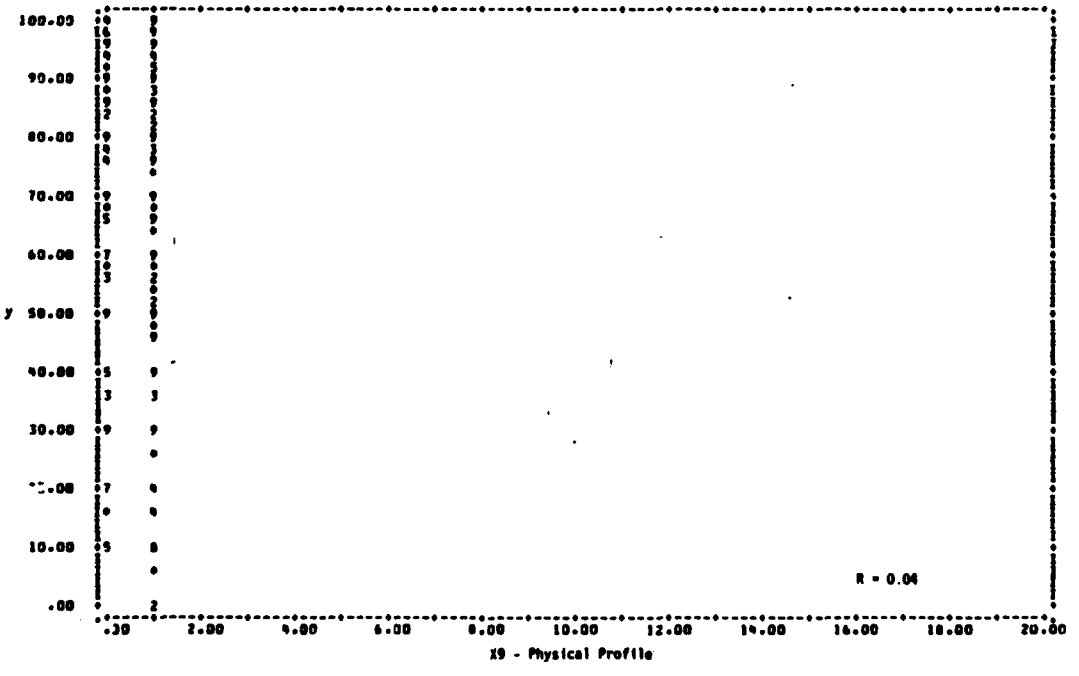


Figure 4-45. Estimated Overall Quality vs Physical Profile

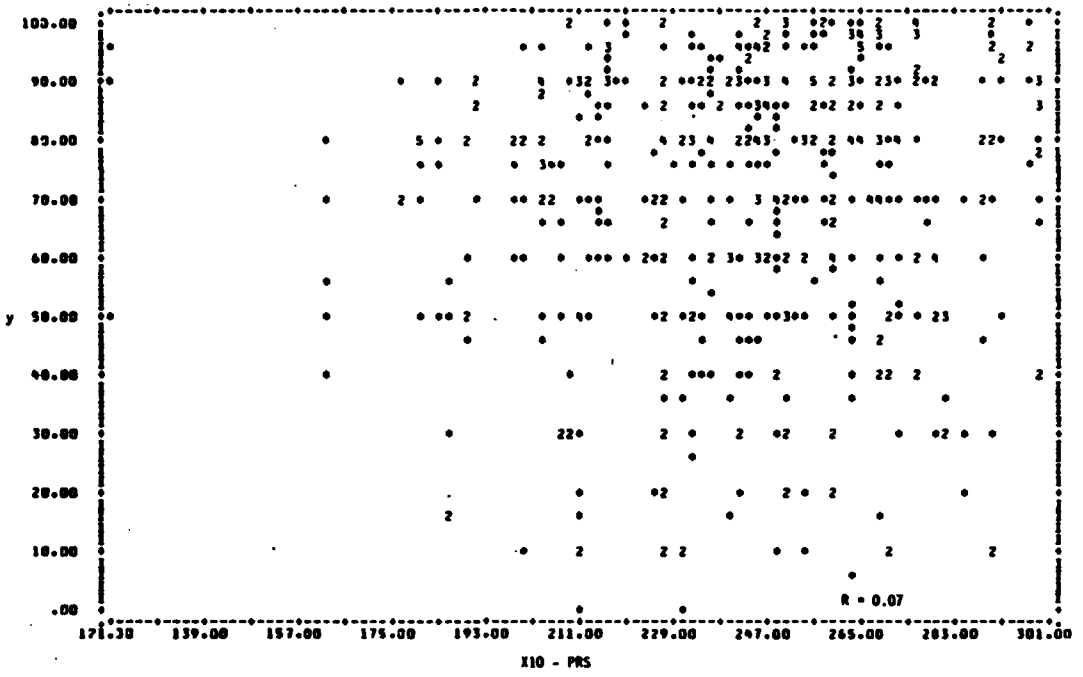


Figure 4-46. Estimated Overall Quality vs Physical Readiness Score (PRS)

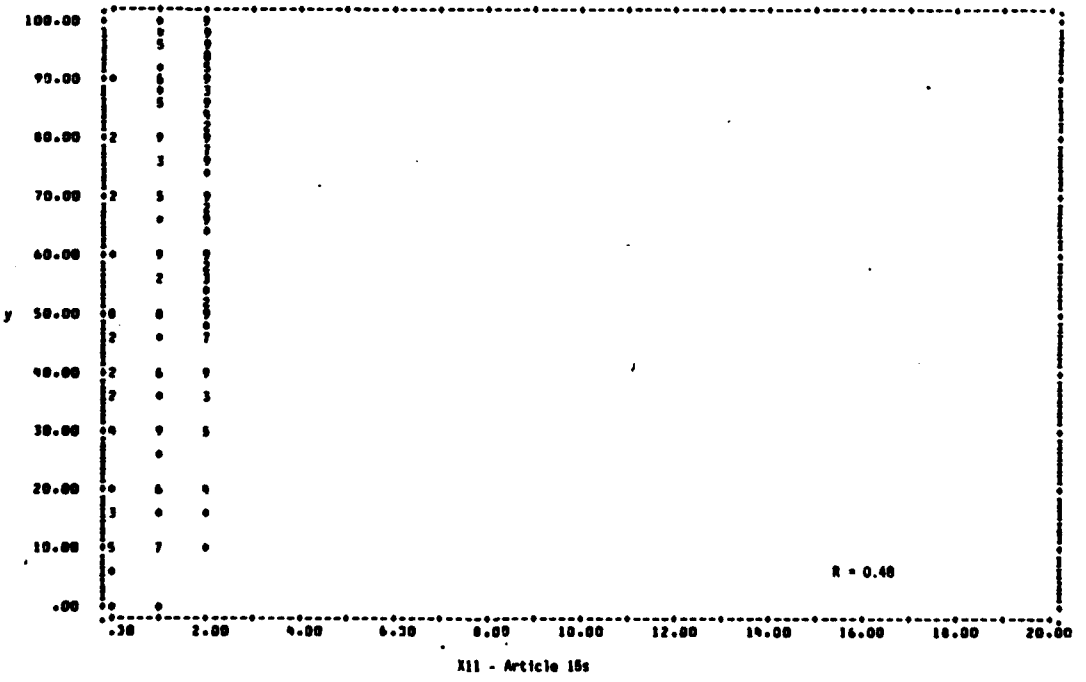


Figure 4-47. Estimated Overall Quality vs Article 15s

e. Conclusions

(1) Objective indicators are not closely correlated with unit supervisors' estimates of overall quality.

(2) Neither a priori evidence nor examination of the data suggests a more suitable model.

4-5. SUPERVISORS' ESTIMATES OF OVERALL QUALITY

a. Description of Data

(1) Quantitative Data. The data for scoring the estimates of overall quality came from Part IV of the questionnaire. Unit supervisors were directed in this part to subjectively estimate, on a numerical scale of 0 to 100, the overall quality of selected first-term soldiers whom they supervised. The score given to a first-term soldier represented the perception by a unit supervisor of the overall quality of that soldier in comparison to all other first-term soldiers whom he/she supervised in that unit. The higher the score, the higher the overall quality of a given first-term soldier as perceived by the supervisor.

(2) Qualitative Data. Supervisors were permitted to enter remarks in Part IV that they felt were appropriate in clarifying their overall quality estimates. Although analysis was not conducted on any of the qualifying remarks, inspection of the remarks showed that first-term soldiers who were either barred from reenlistment or were being processed for elimination from the service received very low overall quality estimates from their supervisors. On the other hand, soldiers who were commented on favorably received very high overall quality estimates.

b. Quality and Quantity of Data. The quality of data obtained on the overall quality estimates was as good as the data obtained on the indicator rankings and the subjective indicator scores. It was legible and appeared to reflect honest opinion. The quantity of data pertaining to the overall quality estimates which was used in the study was identical to the sets of subjective indicator scores used (2,501). This data represented the number of overall quality estimates of 823 first-term soldiers given by 832 different supervisors.

c. Analysis for Consistency. As a check on the reliability of the data, a comparison was made of the observed ratings (y) of estimated overall quality given to first-term enlistees by officers with the observed ratings given by NCOs. An NCO rating and an officer rating of a given first-term soldier were paired together to obtain an abscissa and ordinate value (y_1, y_2), where y_1 was the NCO rating and y_2 the officer rating. Because all first-term soldiers were not rated by both officer and NCO

supervisory personnel, all ratings in the data base were not included in the analysis. Of the total ratings available, 843 officer/NCO pairs were identified. For n = 843, a correlation between y_1 and y_2 larger than approximately 0.08 would be significantly larger than 0 at the $\alpha = 0.01$ level of significance. The sample correlation coefficient, r = 0.68, was highly significant. The correlation between the officer and NCO ratings is graphically illustrated in Figure 4-48. There is no evidence from the data of a difference between officer and NCO estimated overall quality ratings of first-term soldiers.

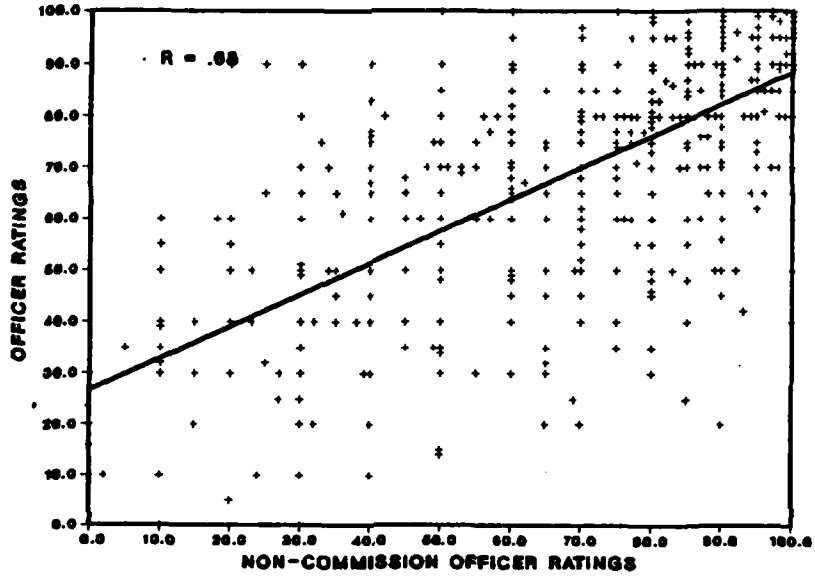


Figure 4-48. Correlation Between Officer and NCO Ratings of Estimated Overall Quality

d. Regression Analysis

(1) Objective and Subjective Indicators Separately

(a) General. Prior to performance of the regression analysis with all indicators as independent variables, separate analyses were made using objective indicators only and subjective indicators only. The analysis of the objective indicators is given first.

(b) Objective Indicators. Stepwise regression was performed on all 11 objective indicators using the model:

$$y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \ldots + \beta_{11} X11 + e,$$

where the Xs are the objective indicators, e is a random error, and y represents the observed rating of estimated overall quality as perceived by the supervisors of first-term soldiers. Complete objective data existed for 164 first-term soldiers, for which a total of 581 supervisory ratings (approximately three per soldier) were available. Correlations between the objective indicators (Xs) and observed ratings of estimated overall quality are given in Table 4-6. The correlations range from 0.006 for X8 to 0.480 for X11. Because all correlations are relatively low, a "good" prediction equation in terms of only the objective indicators is not expected. The prediction equation will be of the form:

$$Y = b_0 + b_1X1 + b_2X2 + \ldots + b_{11}X11,$$

where only statistically significant objective indicators will be included in the equation. The analysis of variance (ANOVA) table (Table 4-7) illustrates the contribution of each significant objective indicator in the prediction equation. Only four objective indicators (X3, X4, X6, and X11) were found to be significant contributors to the prediction of estimated overall quality (Y). The critical values for testing the F-ratios at the α = 0.05 and 0.01 levels of significance are approximately 3.9 and 6.8, respectively. Each row in the ANOVA table shows the improvement in the prediction equation for the successive inclusion of the variable (indicator) shown in the source column. For example, in the first row when Y = f(X11 only), the correlation between Y and y is 0.480 and the percent of the total variability (the adjusted R^2-value) in y accounted for by Y is 22.9 percent. Finally, with all four significant indicators in the prediction equation, Y = f(X3, X4, X6, X11). The four-term prediction equation has a correlation of 0.552 with y and it accounts for 30 percent of the total variability. The four-term prediction equation is:

$$Y = 25.435 + 8.607\ X3 + 8.732\ X4 + 3.680\ X6 + 15.004\ X11.$$

Figure 4-49 illustrates the correlation between y and Y using the four significant objective indicator contributors to estimated overall quality.

Table 4-6. Correlations Between the Xs and y

X1 - 0.008	X5 - 0.141	X9 - 0.042
X2 - 0.131	X6 - 0.154	X10 - 0.069
X3 - 0.378	X7 - 0.093	X11 - 0.480
X4 - 0.213	X8 - 0.006	

Table 4-7. ANOVA on Objective Indicators

Source	DF	Sum of squares	Mean square	F-ratio	R	Adjusted R^2
X11	1	72,438.9		187.0	0.480	0.229
X3	1	10,560.3		27.3	0.514	0.262
X4	1	7,915.4		20.4	0.538	0.286
X6	1	5,060.0		13.1	0.552	0.300
Residual	576	218,408.4	387.3			
Total	580	314,383.0				

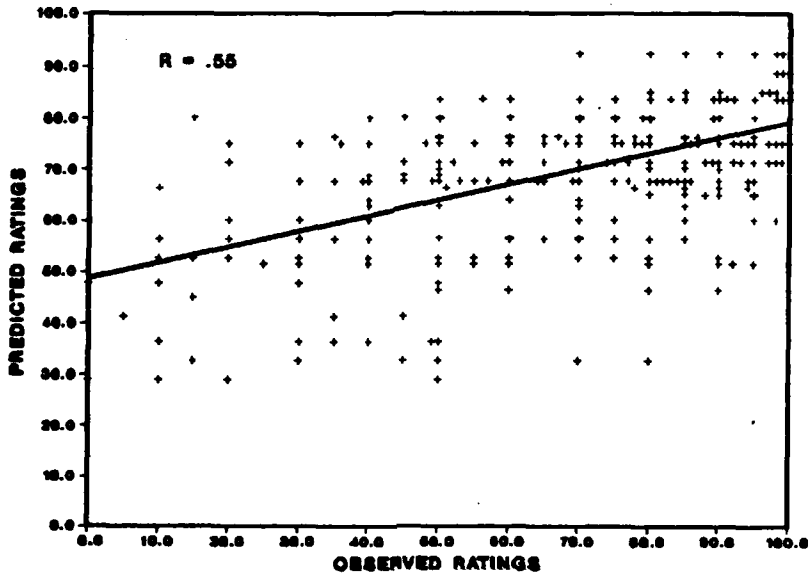


Figure 4-49. Correlation of Observed and Predicted Ratings of Estimated Overall Quality Using Objective Indicators Only (with X3, X4, X6, X11)

(c) Objective Indicators Excluding X5 (SQT). Because of the large number of missing data points for X5 (SQT), a supplementary analysis was performed on only the remaining 10 objective indicators. The purpose of this analysis was to determine whether the incompleteness of data for SQT affected the validity of the previous analysis. The analysis of variance is shown in Table 4-8 below. If additional variables were included with the four shown in the table, R would increase to 0.49 and the adjusted R^2 would increase to only 0.24. Therefore, the statistically significant indicators are considered to be X2, X3, X4, and X11, and the prediction equation is:

$$Y = 15.144 + 1.307\ X2 + 9.222\ X3 + 3.089\ X4 + 15.030\ X11.$$

The prediction equation of objective indicators excluding X5 and the previously obtained prediction equation considering all objective indicators have three variables in common, X3, X4, and X11. The previously obtained equation contained X6, and the above equation contains X2. This can be attributed, at least partly, to the fact that the correlation between X2 and y increased slightly while the correlation between X6 and y decreased. The change of a single variable between the analysis with SQT and the analysis without SQT is considered a slight variation and no more than would have been expected. The use of all objective indicators explained 23 percent of the total variation as compared to 24 percent using these indicators less X5 (SQT). Thus, the supplementary analysis does not refute the major finding of low correlation between objective indicators and overall quality as perceived by unit supervisors.

Table 4-8. ANOVA on Objective Indicators Excluding X5 (SQT)

Source	DF	Sum of squares	Mean square	F-ratio	R	Adjusted R^2
X11	1	170,334.9		468.6	0.416	0.173
X3	1	41,695.5		114.7	0.465	0.215
X2	1	10,937.3		30.1	0.476	0.226
X4	1	5,953.1		16.4	0.483	0.232
Residual	2,073	753,438.1	363.5			
Total	2,077	982,358.9				

(d) Subjective Indicators

1. The same type analysis was applied to the nine subjective indicators using the model,

$$y = \gamma_0 + \gamma_1 W1 + \gamma_2 W2 + \ldots + \gamma_9 W9 + e.$$

The data set contained 2,501 complete and usable subjective indicator ratings (pertaining to 823 soldiers). The correlations between the subjective indicators (W) and the observed ratings (y) of estimated overall quality are given in Table 4-9. The analysis of variance on the subjective indicators is shown in Table 4-10. If testing were done at the $\alpha = 0.05$ level of significance, one could conclude that all indicators except W4 were significant. The corresponding prediction equation would be:

$$Y = 8.866 + 0.070\ W1 + 0.171\ W2 + 0.092\ W3 + 0.135\ W5 + 0.064\ W6 + 0.222\ W7 + 0.100\ W8 + 0.041\ W9$$

Figure 4-50 graphically illustrates the correlation between the predicted and the observed ratings of estimated overall quality using the eight significant subjective indicators.

Table 4-9. Correlations Between the Ws and y

W1 - 0.778	W4 - 0.774	W7 - 0.847
W2 - 0.852	W5 - 0.820	W8 - 0.823
W3 - 0.847	W6 - 0.813	W9 - 0.798

Table 4-10. ANOVA on Subjective Indicators

Source	DF	Sum of squares	Mean square	F-ratio	R	Adjusted R^2
W2	1	857,837.4		9,905.7	0.852	0.725
W7	1	82,130.0		948.4	0.891	0.794
W5	1	15,434.6		178.2	0.900	0.807
W8	1	5,173.5		59.7	0.901	0.812
W1	1	3,272.6		37.8	0.903	0.814
W3	1	1,777.8		20.5	0.903	0.816
W6	1	977.4		11.3	0.904	0.817
W9	1	423.1		4.9	0.904	0.817
Residual	2,492	215,848.8	86.6			
Total	2,500	1,182,425.2				

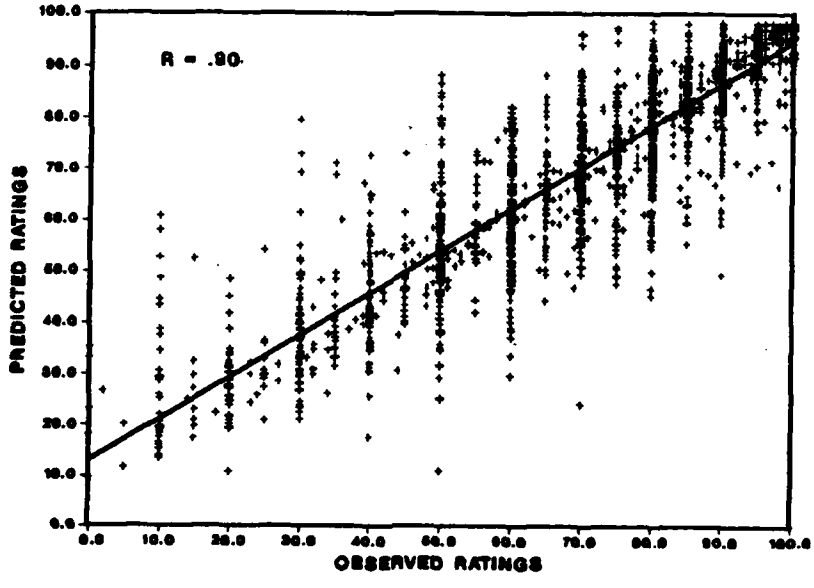


Figure 4-50. Correlation of Observed and Predicted Ratings of Estimated Overall Quality Using Subjective Indicators Only (with W1, W2, W3, W5, W6, W7, W8, W9)

2. Further examination of Table 4-10 shows a saturation effect of the successive inclusion of subjective indicators. The R-values level off at approximately 0.90, and the adjusted R^2-values level off at 0.81 or 0.82. Therefore, in spite of the statistical significance of the last four added indicators (W1, W3, W6, and W9), they add little improvement over the first four included indicators. Consequently, the most useful subjective indicators are considered to be W2, W5, W7, and W8, and the prediction equation is taken to be:

$$Y = 11.358 + 0.271\ W2 + 0.211\ W5 + 0.262\ W7 + 0.121\ W8.$$

Figure 4-51 shows the correlation between Y = f(W2, W5, W7, and W8) and the observed ratings (y) of estimated overall quality. A close comparison of Figure 4-51 with Figure 4-50 reveals that the two figures are nearly indistinguishable. That is, the eight-term prediction equation does not sufficiently improve the four-term equation to justify its use.

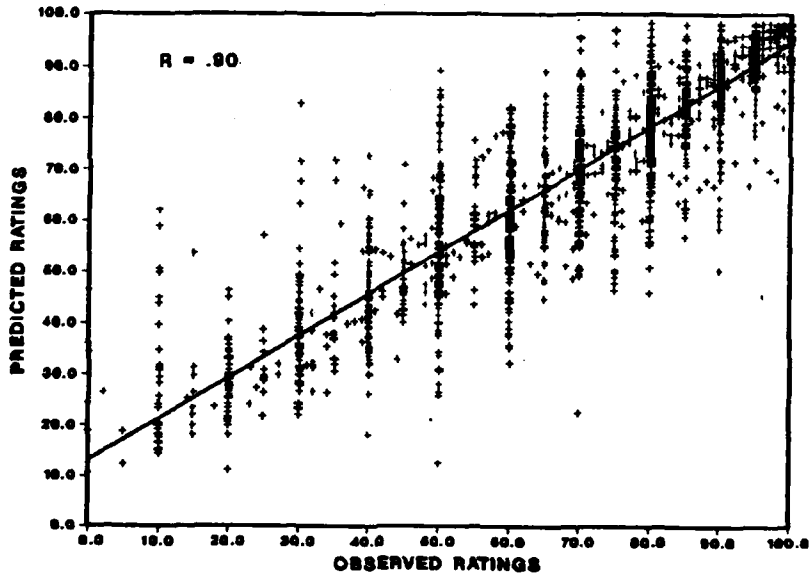


Figure 4-51. Correlation of Observed and Predicted Ratings of Estimated Overall Quality Using Subjective Indicators Only (with W2, W5, W7, W8)

(e) Comparison of Objective and Subjective Prediction Equations. Considering the two, four-term prediction equations and noting Tables 4-7 and 4-10, it can be seen that the correlation between observed estimated overall quality and predicted estimated overall quality using only objective indicators was 0.55, while the correlation between observed estimated overall quality and predicted estimated overall quality using only subjective indicators was 0.90. The objective prediction equation accounted for only 30 percent of the total variability in the data, while the subjective prediction equation accounted for 81 percent of the total variability. On the basis of the regression analysis, the subjective indicators were superior to the objective indicators in identifying first-term enlistees who were perceived to be quality soldiers by supervisors.

(2) Objective and Subjective Indicators Together

(a) Development of Prediction Equations Using All Survey Data. Stepwise regression analysis was used for the development of prediction equations which could be used to rank first-term soldiers according to overall quality as estimated by unit supervisors. A total of 2,501 supervisory ratings of first-term soldiers on the subjective indicators and 164 complete sets of objective data were analyzed in relation to 2,501 supervisory estimates of overall quality on 823 soldiers.

1. All 20 of the quality indicators (11 objective and 9 subjective) were available for use as predictor variables in the analysis. For convenience, the smallest possible subset of the quality indicators was sought which could adequately perform the prediction. Because differences could exist among the various CMFs, each CMF was treated as a distinct stratum of the population of the first-term enlistees. This permitted a different set of variables to be identified for each CMF. A 0.05-level of significance was used for exclusion and inclusion of predictor variables.

2. Initial analysis revealed that the subset of objective indicators had low correlation with overall quality of an enlistee as perceived by unit supervisors. The subjective indicators W1 through W9 tended to dominate the prediction equations, and the objective indicators X1 through X11 tended to be left out of the equations if both Xs and Ws were simultaneously used in the stepwise procedure. Since the Xs were judged to contain valuable information on the first-term enlistees, an effort was made to include as many Xs as possible in the prediction equations. To accomplish this objective, the following procedure was adopted.

a. Stage 1. Apply stepwise regression with all 20 indicators as possible independent variables. This will yield a subset of the 20 indicators and possibly contain both objective and subjective indicators. Assume the following indicators are found to be significant: X2, X11, W1, W5, W7, and W9.

b. Stage 2. Apply stepwise regression to only the Xs as independent variables. This will yield a subset of only the 11 objective indicators. Assume the following indicators are significant: X2, X3, X4, and X11.

c. Stage 3. Combine the two sets of independent variables, found at Stages 1 and 2, into a new set: X2, X3, X4, X11, W1, W5, W7, and W9. Apply stepwise regression to this combined set. Assume the following indicators are found to be significant: X2, X3, X11, W1, W5, W7, and W9. The final prediction equation will have only these indicators in the equation.

3. This same procedure was also used to develop prediction equations for the three common mission areas and the Army-wide case. The Army-wide equation was:

$$Y = 6.44 + 2.41\ X11 + 0.10\ W1 + 0.15\ W2 + 0.09\ W3 + 0.18\ W5 + 0.24\ W7 + 0.11\ W8$$

$$(F = 367.2,\ R^2 = 82\%)$$

4. Despite the use of this very strong procedure, which was intended to force the objective indicators into the equation, note that only one objective indicator, X11 (Article 15s), is contained in the Army-wide equation. The correlation of this prediction equation with observed y is 0.91. The results are similar--few or no significant objective indicators present--for the equations by CMF and mission area, all of which are presented in Appendix E.

(g) Development of Prediction Equations Using Complete Records Only. Because of missing data on objective indicators, the above analysis was repeated for the Army-wide case using only those records on first-term soldiers for which valid data was available on all 11 objective indicators. This data set was comprised of 581 supervisory ratings of 164 first-term soldiers. The analysis of variance table is given in Table 4-11, below. Using an $\alpha = 0.05$ level of significance, one can conclude that the significant indicators are X11, W2, W3, W5, W7, and W8. However, again examining the R-values and the adjusted R^2-values and using the same rationale as before, indicators W2, W5, W7, and W8 can be considered the significant indicators. Using these four indicators yields the following prediction equation:

$$Y = 8.064 + 0.226\ W2 + 0.294\ W5 + 0.243\ W7 + 0.136\ W8$$

$$(F = 13.7,\ R^2 = 84\%)$$

A comparison of this equation with the one above shows a strong agreement between the two. This prediction equation has a correlation with observed

y of 0.92 as compared to 0.91 for the equation using all survey data. Therefore, the incompleteness of the objective data does not seem to affect the validity of the conclusions. Because the two correlations are indistinguishable, a plot of the observed and predicted ratings is not repeated.

Table 4-11. ANOVA on Objective and Subjective Indicators

Source	DF	Sum of squares	Mean square	F-ratio	R	Adjusted R^2
W2	1	234,451.4		2,679.4	0.864	0.745
W7	1	20,301.1		232.0	0.900	0.810
W5	1	6,820.0		77.9	0.912	0.831
W8	1	1,197.6		13.7	0.914	0.835
W3	1	858.6		9.8	0.916	0.837
X11	1	537.4		6.1	0.917	0.839
Residual	574	50,217.4	87.5			
Total	580	314,383.5				

e. Use of Prediction Equations. The prediction equations can be used to rank qualified, potential reenlistees in terms of overall quality as perceived by unit supervisors.

(1) Example. The prediction equation developed in this study for CMF 11 (Infantry) (Appendix E) is:

$$Y = 1.04 + 4.08\ X11 + 0.18\ W2 + 0.30\ W3 + 0.12\ W5 + 0.27\ W7$$

where,

Y is the predicted value of overall quality of a soldier as perceived by unit supervisors

X11 represents the assigned score pertaining to the number of Article 15s given to a soldier
- 2 if a soldier has no Article 15s
- 1 if a soldier has one Article 15
- 0 if a soldier has more than one Article 15

W2 is a soldier's score on general discipline (range of 0 to 100)

W3 is a soldier's score on military bearing (range of 0 to 100)

W5 is a soldier's score on job performance (range of 0 to 100)

W7 is a soldier's score on leadership potential (range of 0 to 100)

This prediction equation should be treated as an entity. The individual coefficients of the indicators should not be used alone, nor should they be compared to each other. The indicators included in the equation (X11, W2, W3, W5, and W7) are those which are most highly correlated with overall quality as perceived by unit supervisors of a first-term soldier in CMF 11. If scores for the indicators are obtained for a given soldier, that soldier's overall quality as predicted by a unit supervisor can be computed. For example, if X11 = 2, W2 = 80, W3 = 50, W5 = 90, and W7 = 90, the soldier's predicted overall quality is Y = 73.7. It is possible that two soldiers can have different scores for each indicator and yet have the same value for predicted overall quality as measured by Y. It is also possible to have different Y values for the same soldier if more than one supervisor rates that soldier. Averaging Y values could then be used as a means to obtain one overall Y value for a given soldier.

(2) A comparison of different prediction equations shows that the indicators most highly correlated with overall quality as perceived by unit supervisors vary considerably by CMF. Factors which may affect this variation include the sample size of each CMF, the incompleteness of objective indicator data, the generally low correlation of objective indicators with perceived overall quality, and differing skills and attitudes required in the various CMFs. The absence of an indicator from an equation does not necessarily mean that the traits represented by that indicator are unimportant for success in the CMF, but only that it is not useful in predicting overall quality as perceived by unit supervisors. Indicators found by regression analysis to be highly correlated with estimated overall quality for each CMF analyzed are depicted in Table 4-12.

f. A Potential Application

(1) The prediction equations of overall quality of first-term enlistees as perceived by unit supervisors could possibly be applied as management tools for reenlistment policy decisions. An illustration of this potential application would be the establishment of a threshold value for reenlistment. CMF 13, which had supervisors' ratings given to 80 first-term enlistees, will be used for illustrative purposes. The principle of application would be the same for the other 14 CMFs for which data were obtained and analyzed, as well as for the three common mission areas and the Army-wide application.

(2) The empirical cdf, S(Y), was generated for the prediction equation for CMF 13. The hypothesis was tested that the predicted values of overall quality (Y) as perceived by unit supervisors in CMF 13 followed a normal distribution, with parameters estimated from the sample giving mean Y = 66.8 and a standard deviation (s.d.) = 20.3. A nonparametric test, the KS-test, was applied to test normality. From the sample data, a $D(Y) = \text{Max}|S(Y)-F(Y)| = 0.114$ was obtained, where F(Y) is the theoretical cdf. The critical value of D was 0.115 for $\alpha = 0.01$. Therefore, the assumption of normality could not be rejected.

Table 4-12. Important Indicators of Quality by CMF

CMF	NAME	X1 AFQT	X2 Cived	X3 Rank	X4 Miled	X5 SQT	X6 IWS	X7 A&D	X8 Wt control	X9 Phy profile	X10 PRS	X11 Art 15s	W1 Gets along	W2 Discipline	W3 Bearing	W4 Appearance	W5 Performance	W6 Trainability	W7 Leadership	W8 Conduct	W9 Communicates
11	Infantry											■		■	■		■		■		
12	Combat engineering											■			■						■
13	Artillery								■			■		■			■				■
*16	Air Defense Artillery																				
19	Armor			■	■						■	■			■	■			■		
*29	Communications maintenance																				
31	Communications operation													■			■		■		
51	General Engineering											■			■		■				
54	Chemical operations											■	■						■		
63	Mechanical maintenance											■		■							
64	Transportation	■												■	■		■				
67	Aviation										■					■	■		■		
71	Administration			■								■		■	■		■	■	■		
76	Supply and services							■				■		■			■		■		
91	Medical												■	■					■		
94	Food service				■								■					■			
95	Law enforcement												■	■	■					■	
*96	Military intelligence																				
*98	Cryptologic operations																				

*Analysis was not done due to insufficient sample size.

(3) If the distribution generated by the prediction equation is normal, simple computational or graphical techniques can be used to rank potential reenlistees. Suppose that for CMF 13:

- number of eligible reenlistment candidates = 80;
- number of reenlistment vacancies = 56;
- proportion of candidates permitted to reenlist = 0.7.

The assumption of normality allows us to define the threshold value for reenlistment. For CMF 13, the threshold value is equal to 56.2. Therefore, all eligible reenlistment candidates with a Y equal to or greater than 56.2 can be reenlisted without oversubscribing. Since prediction equations vary with CMF, the threshold value will differ from CMF to CMF.

(4) A conceptual scheme for application of this tool is given in Appendix F. In evaluating the use of this technique, factors to be considered include: (1) the desirability of employing a method which is "calibrated" by perceptions of unit supervisors; (2) administrative workload involved in gathering objective data and subjective ratings; and (3) actual availability of the necessary objective data.

g. Comparison of Objective and Subjective Indicators

(1) The prediction equations developed in this study can be used to rank first-term soldiers in order of overall quality as perceived by unit supervisors. These rankings could then be used to select those soldiers who would be allowed to reenlist in situations where expected reenlistments exceed requirements. In order to compare the effect of using subjective indicators for rank ordering soldiers rather than objective indicators (the current practice), an additional analysis was conducted.

(2) There are 164 enlistees for whom scores on all objective indicators (X1, X2, ... , X11) are available. The number of complete supervisory ratings on the subjective indicators for this group of enlistees is 581. Since a complete record in this survey is comprised of both subjective and objective scores of the indicators, complete records existed for a set of 581 subjective indicator ratings given to 164 enlistees, each of whom had a complete set of objective indicator scores.

(3) For a comparison of the performance of these two sets of indicator data in ranking potential reenlistees, the following method was adopted. Prediction of perceived quality Y_X using the objective indicator data set only is:

$$Y_X = 25.4 + 8.607\ X3 + 8.732\ X4 + 3.680\ X6 + 15.004\ X11.$$

There are 164 Y_X scores, one for each enlistee with a complete set of objective indicator data. The prediction equation using subjective indicators gives Y_W, the perceived quality of a first-term soldier based on the ratings of his supervisors. Y_W is:

$$Y_W = 11.4 + 0.271\ W2 + 0.211\ W5 + 0.262\ W7 + 0.121\ W8.$$

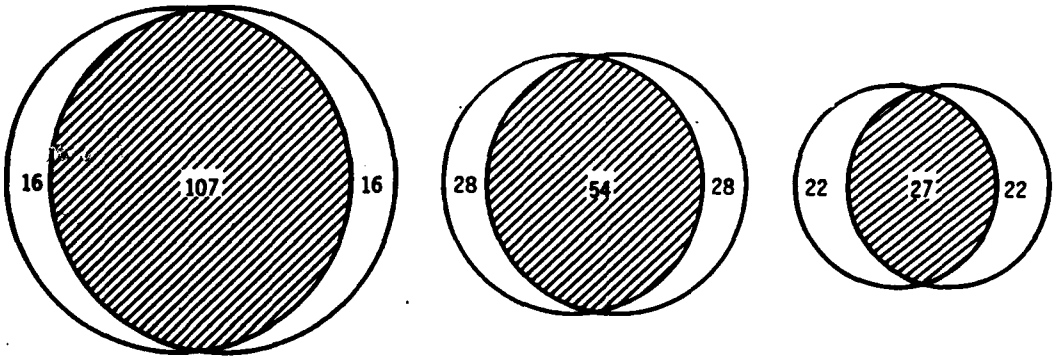
There are 581 values of Y_W, one per supervisory rating. Since there are multiple ratings for each soldier, the median of Y_W for each enlistee was used. There are 164 median values of Y_W, one for each enlistee.

(4) The effect of using subjective and objective indicators in ranking first-term enlistees can now be evaluated by comparing 164 values of Y_X with 164 values of Y_W. If the enlistees are ranked in descending order of Y_X and again in descending order of Y_W, the effect of the two rankings will give a comparison of the performance of the two sets of indicators in rank ordering in terms of perceived overall quality. Table 4-13 compares the differences between the two sets of indicator data in ranking first-term soldiers. For example, select the top 75 percent (123) of the enlistees as ranked by Y_X. If the top 75 percent are selected by Y_W scores, there are 107 matches between the two sets. If the upper 20 percent of the enlistees were selected for reenlistment, the two methods agree on only 46 percent of the enlistees; more than 50 percent of the enlistees will be different in the two sets.

Table 4-13. Comparison of Objective and Subjective Indicators

Upper percentage of data sets	Sample size	Number of matches	Percentage of matches
100	164	164	100
75	123	107	76
50	82	54	66
30	49	27	55
20	33	15	46
10	16	6	38

(5) Figure 4-52 illustrates the comparison. Assuming that there is a requirement to reenlist 75 percent of the 164 available first-term soldiers who are eligible and willing to reenlist, 123 soldiers will be selected. The two groups, one selected using only subjective indicators and one using only objective indicators, each have 107 members in common and 16 soldiers who would not have been selected by the other method. When only 30 percent are required, the groups have 27 members in common and each includes 22 who would not have been selected by the other method.



Upper percentage	75	50	30
Sample size	123	82	49

Figure 4-52. Comparison of Objective and Subjective Indicators for Three Sample Sizes

(6) Objective indicators were used in this analysis in a method which was not identical to the current practice of using such criteria as hurdles. Nevertheless, the results strongly suggest that the groups of first-term soldiers selected for reenlistment relying on the subjective indicators, which were considered more important by unit supervisors, would differ noticeably from groups selected by objective indicators alone.

h. Conclusions

(1) A prediction equation on an Army-wide basis which uses only objective indicators as predictor variables accounts for only 30 percent of the total variability in overall quality as perceived by unit supervisors.

(a) This result is consistent with the low ranking of objective indicators discussed in paragraph 4-2, above.

(b) Objective indicators are of little use in ranking potential reenlistees in order of quality as perceived by unit supervisors.

(c) When SQT score is excluded from consideration as one of the objective predictor variables, results change only slightly.

(2) A prediction equation on an Army-wide basis which is composed of a small subset (four) of the subjective indicators accounts for 81 percent of the total variability in overall quality as perceived by unit supervisors.

(a) This result is consistent with the high ranking of subjective indicators noted in paragraph 4-2, above.

(b) Subjective indicators are highly useful in ranking potential reenlistees in order of quality as perceived by unit supervisors.

(3) Using a step-wise regression procedure intended to make use of the valuable information contained in the objective indicators, a prediction equation can be obtained on an Army-wide basis which accounts for 82 percent of the total variability in overall quality as perceived by unit supervisors. Only one objective indicator is present in this equation.

(4) The subjective and objective indicators can be used to identify which first-term soldiers their supervisors would consider to be of high quality for reenlistment.

(5) In the absence of a universally agreed upon definition of quality and an accepted method of reliably measuring it, one cannot be certain that the subjective and objective indicators would actually identify those first-term soldiers who would prove to be of the highest quality if reenlisted.

(6) A group of high quality first-term soldiers chosen from the potential reenlistment pool using only objective indicators is noticeably different than a group chosen using only subjective indicators.

(7) The observed care which unit supervisors took in completing the survey, the high correlations between subjective indicators and overall quality estimates, and the consistency between officer and NCO ratings lend support to the initial premise of the study that use of multiple indicators of quality produce a better assessment of quality than a single overall estimate.

CHAPTER 5

OBSERVATIONS

5-1. PURPOSE. The purpose of this chapter is to summarize study results, address essential elements of analysis, and present key observations.

5-2. SUMMARY OF STUDY RESULTS. A total of 15 CMFs were analyzed during this study. Regression analysis was used to develop prediction equations relating overall quality of first-term soldiers as perceived by unit supervisors to 20 objective and subjective indicators of quality. Equations were also developed for the common mission areas of combat, combat support, combat service support, and for Army-wide application. Each equation contains those particular subjective and objective quality indicators which regression analysis showed to be highly correlated with overall quality estimates given by unit supervisors. Indicator ratings, supervisors' rankings of indicators' importance, and supervisors' estimates of the overall quality of first-term soldiers were all analyzed to test the confidence in using the indicators in a system for identifying quality of first-term soldiers. The analyses showed that both officer and NCO supervisors are consistent, both in viewing subjective indicators as more important than objective indicators and also in estimating overall quality of first-term soldiers. These analyses were consistent with the predominance in appearance of subjective indicators in the prediction equations as compared to objective indicators.

5-3. ESSENTIAL ELEMENTS OF ANALYSIS. Listed below are the essential elements of analysis (EEA) from the FITREQUEST study directive and the applicable study observations which are responsive to each EEA.

a. "What guidelines are currently available to Department of the Army and unit commanders which indicate quality and potential of first-term soldiers?" The only guidelines currently available at HQDA and unit level are contained in AR 601-280 in the form of reenlistment criteria. The majority of these criteria are either closely associated with or are identical to the objective indicators used in the study.

b. "What criteria to measure quality can be instituted at HQDA and unit level to identify quality first-term soldiers world-wide?" Analysis showed that the criteria which best predicted the overall quality ratings which would be assigned to first-term soldiers by their unit supervisors were composed of a set of objective and subjective quality indicators. The composition of the set of indicators varies by CMF. The values of the

subjective indicators are attribute ratings assigned by unit supervisors; if an evaluation system based on these indicators is used, quality ratings must be made at the unit level world-wide as a part of an overall measurement system under HQDA guidance.

c. "What indicators can be used to provide early identification of quality first-term soldiers?" Of the twenty quality indicators analyzed in the study, 16 were found by analysis of ratings given by unit supervisors to be significant contributors to estimation of overall quality as perceived by unit supervisors. Three or more of these 16 indicators appear in each prediction equation developed during analysis. Four indicators (Civilian Education, Skill Qualification Test, Individual Weapon Score and Physical Profile) were found not to be significant contributors to estimation of overall quality as perceived by unit supervisors and therefore do not show up in any of the prediction equations listed in Appendix E.

d. "Which indicators provide the best measures of discrimination of high quality?" On the basis of the Army-wide analysis done in the study, seven quality indicators were highly correlated with the overall quality of first-term soldiers as estimated by unit supervisors. If unit level perceptions are accepted as the measure of quality, the following indicators provide the best measure of discrimination: Leadership Potential, General Discipline, Job Performance, Military Bearing, Article 15s, Moral and Social Conduct, and Gets Along with Others.

5-4. KEY OBSERVATIONS

a. There is no widely accepted, general, useful definition of soldier quality available in the US Army.

b. Current guidelines to determine quality of first-term soldiers are based only on objective criteria which are poorly correlated with overall quality of first-term soldiers as perceived by unit supervisors. The use of these guidelines does not make use of the information which the unit level chain of command is eager to provide.

c. Objective data is often incomplete or unavailable. Of the 823 soldiers included in this study, only 164 had complete records of the 11 objective indicators. Four of the objective indicators which are currently used to determine a go/no go on reenlistment eligibility for first-term soldiers are not data elements maintained on the EMF. These are: Physical Readiness Test, Individual Weapon Score, Weight Control, and Article 15s.

d. A subset of the objective and subjective indicators can be used to identify which first-term soldiers their supervisors would consider to be of high quality for reenlistment. In the absence of a universally agreed upon definition of quality and an accepted method of reliably measuring it, one cannot be certain that the indicators would actually identify those soldiers who would prove to be of the highest quality if reenlisted.

e. Unit level chain of command perception and HQDA DA policy can be combined in a mutually supportive system for identifying soldiers for reenlistment. HQDA is aware of the total needs and direction of the Army while the unit level chain of command has the best view of quality as reflected in demonstrated daily performance. A conceptual method to incorporate unit level judgments is in Appendix F.

f. Implementation of a system for estimating quality of first-term soldiers which includes both HQDA and the unit level chain of command will increase the administrative workload. If a policy decision is made to incorporate unit level judgments of quality, a further study of both the administrative feasibility of the conceptual method in Appendix F and alternative methods is necessary.

APPENDIX A

STUDY CONTRIBUTORS

1. STUDY TEAM

a. Study Director

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APPENDIX B

STUDY DIRECTIVE

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR PERSONNEL
WASHINGTON, DC 20310

REPLY TO ATTENTION OF

16 NOV 1982

DAPE-MPD-RT

SUBJECT: First Term Reenlistment Quality Study (FITREQUEST)

Director
US Army Concepts Analysis Agency
8120 Woodmont Avenue
Bethesda, Maryland 20814

1. PURPOSE OF DIRECTIVE. This directive provides for the establishment of a study group to conduct the subject study.

2. BACKGROUND.

a. The Military Personnel Management Division (DAPE-MP) of the Office of the Deputy Chief of Staff for Personnel (ODCSPER) has been charged with the selection and retention of high quality first term soldiers to meet mandatory year end strengths.

b. Although current standards and guidelines exist for reenlistment of individual first term soldiers, they are insufficient to provide across-the-board identification of the best qualified soldiers to meet strength goals either Army-wide or by specific MOS.

c. Present methods do not adequately identify those high quality soldiers required to operate the high technolocical equipment entering the inventory.

3. STUDY SPONSOR AND STUDY SPONSOR'S DIRECTOR. Office of the Deputy Chief of Staff for Personnel, SGM James D. Hawley.

4. STUDY AGENCY. US Army Concepts Analysis Agency (CAA).

5. TERMS OF REFERENCE.

a. Scope.

(1) The study will focus on Active Army first term soldiers in the grade of E-4 and below and will attempt to develop a reliable and valid method for early identification of qualified potential reenlistees. The analysis will include development of guidelines which may be used to compare the quality of these soldiers on either an Army-wide or CMF basis.

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(2) Based upon implementation of viable procedures resulting from this action, a follow-on study targeted at Reserve Component personnel may be considered.

b. Objectives.

(1) Analyze Army first term selection guidelines and evaluate the quality of first termers reenlisted.

(2) Develop a methodology which will provide the study proponent and the unit commander with early identification of quality first term soldiers throughout the Army.

(3) Develop a process which allows selection of high quality first term soldiers for reenlistment.

c. Timeframe. FY83

d. Assumptions.

(1) Some elements of quality may not be measurable.

(2) Reenlistment incentives will continue to be offered to qualified first term soldiers.

(3) An all vonunteer force will continue to exist.

(4) Local commanders desire to input to the quality reenlistment decision process.

e. Essential Elements of Analysis (EEA). (Questions to be answered by analysis.)

(1) What guidelines are currently available to Department of the Army and unit commanders which indicate quality and potential of first term soldiers?

(2) What criteria to measure quality can be instituted at HQDA and unit level to identify quality first term soldiers world-wide?

(3) What indicators can be used to provide early identification of quality first term soldiers?

(4) Which indicators provide best measures of discrimination of high quality?

f. Environmental and threat guidance. No environmental consequences are envisioned; however, the study agency is required to surface and address any environmental considerations that develop in the course of the study effort.

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g. Estimated cost savings or other benefits. The study will result in a more efficient method of maintaining strength goals through improvement of retention and reenlistment procedures.

6. RESPONSIBILITIES.

a. ODCSPER.

(1) Will prepare an evaluation of study results in accordance with AR 5-5.

(2) Provide a list of Points of Contact (POC) at Department of Defense (DOD); Headquarters, Department of the Army (HQDA); major Army commands (MACOM); and other agencies as appropriate.

(3) Furnish available reenlistment data, reenlistment projections, and personnel information to CAA as required. If data are late or inadequate, adjust study schedule and/or scope accordingly.

b. CAA.

(1) Will designate a study director and a study team.

(2) Will coordinate/communicate with appropriate commands/agencies for data necessary to accomplish the study.

(3) Provide periodic In-Process Reviews (IPR) as requested by ODCSPER and provide a final study report to the study proponent.

(4) Will provide final study results to the study sponsor.

c. MACOMS.

(1) Will designate a POC as/if required.

(2) Will participate in SAG meetings if necessary.

(3) Will provide input concerning retention policies, procedures, capabilities, and requirements as requested by CAA or ODCSPER.

d. MILPERCEN.

(1) Will designate a POC if required.

(2) Will participate in SAG meetings as required.

(3) Will provide input concerning retention policies, procedures, capabilities, and requirements as requested by CAA or ODCSPER.

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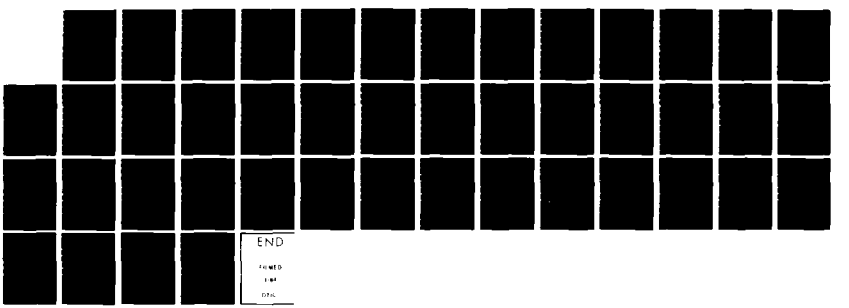

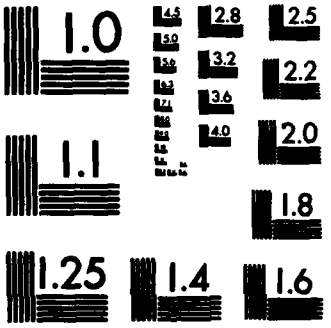

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7. LITERATURE SEARCH. The following studies are related to the subject of this study.

a. Office of the Secretary of Defense (Manpower, Reserve Affairs and Logistics), Profile of American Youth, Washington, D.C., 1982.

b. United States General Accounting Office, The Army Needs to Modify Its System for Measuring Individual Soldier Proficiency, Washington, D.C., 30 March 1982.

c. US Concepts Analysis Agency, Personnel Retention Model Analysis, Technical Paper CAA-TP-80-1, Bethesda, MD., January 1980.

d. Soldier Support Center, National Capital Region, TRADOC Briefing, Force Competency, 4 August 1982.

e. United States Army Training and Doctrine Command, Soldier Capability - Army Combat Effectiveness. Ft Benjamin Harrison, Ind., April 1981.

f. Deputy Chief of Staff for Personnel, Quality Personnel, Washington, D.C. 11 February 1982.

8. REFERENCES.

a. AR 5-5, The Army Study System, 5 July 1977.

b. DA PAM 5-5, Guidance for Army Study Sponsors, Sponsor's Study Directors, Study Advisory Groups, and Contracting Officer Representatives, April 1982.

c. AR 340-2, Maintenance and Disposition of Records in TOE Units of the Active Army, the Army Reserve, and the National Guard, March 1981.

d. AR 340-21, The Army Privacy Program, August 1975.

e. AR 350-1, Army Training, September 1981.

f. AR 601-280, Army Reenlistment Program, July 1977.

g. AR 611-201, Enlisted Career Management Fields and Military Occupational Specialties, October 1973.

h. AR 635-200, Personnel Separations, Enlisted Personnel, October 1982.

9. ADMINISTRATION.

a. Support.

(1) Funds for CONUS Travel/per diem will be provided by the parent

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organization of each study participant. ODCSPER will assist in obtaining funds and clearances for required OCONUS TDY.

(2) Clerical support will be provided by CAA.

(3) ADPE support will be provided by CAA.

b. Milestone Schedule. (Additional events and a detailed schedule will be identified in the study plan.) Critical events will include:

(1) Brief study plan to SAG.	15 January 1983
(2) In process review.	28 February 1983
(3) Final results briefing	15 June 1983
(4) Delivery of study report	31 July 1983

c. Control procedures.

(1) ODCSPER will provide a Sponsor's Study Director to provide guidance for the study.

(2) ODCSPER will constitute and chair a SAG to monitor study process.

(3) ODCSPER will prepare and submit DD Form 1498 and final study documents to DTIC.

d. Coordination. This directive has been coordinated with CAA IAW AR 10-38.

FOR THE DEPUTY CHIEF OF STAFF FOR PERSONNEL:

JACK C. WHEELER
Colonel, GS
Chief, Professional
Development Division

APPENDIX C

BIBLIOGRAPHY

DEPARTMENT OF DEFENSE

Department of Defense (DOD) Publications

Profile of American Youth/1980 Nationwide Administration of the Army Service Vocational Aptitude Battery. Office of the Assistant Secretary of Defense (Manpower, Research Affairs and Logistics), March 1982

Report to the Congress: B-160096 Military Retention Incentive: Effectiveness and Administration, Comptroller General of the United States, DOD, Washington, DC, July 1974 (UNCLASSIFIED)

DEPARTMENT OF THE ARMY

Department of the Army (DA) Publications

AR 340-2, Maintenance and Disposition of Records in TOE Units of the Active Army, the Army Reserve and the National Guard, March 1981 (UNCLASSIFIED)

AR 340-17, Release of Information and Records from Army Files, October 1982 (UNCLASSIFIED)

AR 340-21, The Army Privacy Program, August 1975 (UNCLASSIFIED)

AR 340-21-6, The Army Privacy Program: System Notices and Exemption Rules for General Personnel Management and Safety Functions, May 1982 (UNCLASSIFIED)

AR 340-21-7, The Army Privacy Program: System Notices and Exemption Rules for Military Personnel Functions, December 1982 (UNCLASSIFIED)

AR 340-21-10, The Army Privacy Program: System Notices and Exemption Rules for Training and Education Functions, October 1981 (UNCLASSIFIED)

AR 350-1, Army Training, August 1981 (UNCLASSIFIED)

AR 350-4, Qualification and Familiarization with Weapons and Weapon Systems, September 1973 (UNCLASSIFIED)

AR 351-1, Individual Military Education and Training, March 1981 (UNCLASSIFIED)

AR 600-9, The Army Weight Control Program, February 1983 (UNCLASSIFIED)

AR 600-15, Indebtedness of Military Personnel, November 1979 (UNCLASSIFIED)

AR 600-31, Suspension of Favorable Personnel Actions for Military Personnel in National Security Cases and Other Investigations or Proceedings, November 1982 (UNCLASSIFIED)

AR 600-37, Unfavorable Information, November 1980 (UNCLASSIFIED)

AR 600-200, Enlisted Personnel Management System, January 1981 (UNCLASSIFIED)

AR 601-210, Regular Army and Army Reserve Enlistment Program, September 1982 (UNCLASSIFIED)

AR 601-222, Armed Service (Institutional) Vocational Testing Program, July 1981 (UNCLASSIFIED)

AR 601-280, Army Reenlistment Program, July 1977 (UNCLASSIFIED)

AR 611-1, Military Occupational Classification Structure Development and Implementation, April 1976 (UNCLASSIFIED)

AR 611-5, Army Personnel Selection and Classification Testing, November 1982 (UNCLASSIFIED)

AR 611-201, Enlisted Career Management Fields and Military Occupational Specialities, October 1973 (UNCLASSIFIED)

AR 614-5, Stabilization of Tours, April 1983 (UNCLASSIFIED)

AR 614-6, Permanent Change of Station Policy, February 1981 (UNCLASSIFIED)

AR 614-200, Selection of Enlisted Soldiers for Training and Assignment, February 1980 (UNCLASSIFIED)

AR 635-200, Personnel Separation: Enlisted Personnel, October 1982 (UNCLASSIFIED)

AR 640-2-1, Personnel Records and Identification of Individuals: Personnel Qualification Record, April 1983 (UNCLASSIFIED)

AR 640-10, Individual Military Personnel Records, February 1981 (UNCLASSIFIED)

AR 640-15, Criteria for Insuring the Competency of Personnel to Install, Maintain, and Repair Communications Security Equipment, September 1974 (UNCLASSIFIED)

The Gideon Criterion: The Effects of Selection Criterion on Soldier Capabilities and Battle Results. USAREC, Gaphenwohr, Germany, June 1981

Stary, GEN D. A. (CG, TRADOC), Values, Not Scores; the Best Measure of Soldier Quality, Army, October 1980

US Army Military Personnel Center (MILPERCEN)

Force Management Book: Career Management Fields 11-12-13-16-19-23-27-28-29-31-33-51-54-55, MILPERCEN, Alexandria, VA, October 1982 (UNCLASSIFIED)

Force Management Book: Career Management Fields 63-64-67-71-74-76-79-81-84-91-92-94-95-96-97-98, MILPERCEN, Alexandria, VA, July 1982 (UNCLASSIFIED)

Assessment of Quality of Life Programs, MILPERCEN Survey Control APC-MSF-S-79-28, ODCSPER 1979

US Army Test and Evaluation Command (TECOM)

TECOM Pam 602-1, Vol I, Man-Materiel Systems Questionnaire and Interview Design (Subjective Testing Techniques), July 1975

US Army Concepts Analysis Agency (CAA)

Selective Reenlistment Bonus (SRB) Study, CAA-SR-82-6, August 1982 (UNCLASSIFIED)

Personnel Retention Model Analysis, CAA-TP-80-1, January 1980 (UNCLASSIFIED)

MISCELLANEOUS PUBLICATIONS

Robert Dyer, et al., Report P-77-2, Questionnaire Construction Manual Annex: Literature Survey and Bibliography, Operations Research Association, Palo Alto, CA, July 1976

Arthur G. Jago and Victor H. Vroom, Technical Report #10, Predicting Leader Behavior From a Measure of Behavioral Intent, Yale University, New Haven, CT, July 1976

Robert Dyer, Report P-77-1, Questionnaire Construction Manual, Operation Research Associates, Palo Alto, CA, July 1976

Richard J. Orend, et al., Reenlistment Evaluation: A Study of the Army Reenlistment System and an Evaluation of Current and New Reenlistment Standards, Human Resources Research Organization, Alexandria, VA, September 1976

Milton H. Maier and Stephen F. Hirshfeld, Research Report 1193, Criterion-Referenced, Job Proficiency Testing: A Large Scale Application, ARI Individual Training and Skill Evaluation Technical Area, Alexandria, VA, February 1978

Milton L. Boykin, et al., A Preliminary Report, Naval Research Personnel Attitude Survey 1979, Readiness Command Region Seven - Retention, October 1979

John T. Warner, CRC 376, Alternative Military Retirement Systems; Their Effects on Enlisted Retention, Center for Naval Analyses, Alexandria, VA, September 1979

Mathew S. Goldberg, CNA 81-0916, A Comparison of the Prophet and ACOL Force Projection Models, Center for Naval Analyses, Alexandria, VA, June 1981

Mathew S. Goldberg, CNA 81-0833, Projecting the Impact of Targeted Pay Increases, Center for Naval Analyses, Alexandria, VA, May 1981

Edward R. Bushyhead, US Army Up-or-Out Policy for Enlisted Personnel, Research Report 296, Air War College, Maxwell AFB, Alabama, April 1978

James M. LaRocco, et al., Prediction of Reenlistment: A Discriminant Analysis Approach, Naval Health Research Center, San Deigo, CA, March 1975

J. M. LaRocco, W. M. Pugh, E. K. E. Gunderson, Report 76-10, Identifying Determinants of Retention Discussion, Naval Health Research Center, San Diego, CA, November 1976

William J. Taylow, Jr., et al., Army Manpower Issues for the 1990's: Moving from "Zero-Sum" to the "Prisoners Dilemma," Army 2000 Project (Draft), Georgetown University Center for Strategic and International Studies, Washington, DC, May 1982

John R. Dempsey, Likelihood Function Estimation (LIFE) Model; Utility in the Development of an Enlistment Standard, Kintron International Inc., Fort Worth, TX, February 1981

Proceedings, 23d Annual Conference of the Military Testing Association, Coordinated by US Army Research Institute for the Behavioral and Social Sciences, Volumes I and II, Arlington, VA, 25-30 October 1981

Stephen J. Motowidlo, Marvin D. Dunnette, and Rodney J. Rosse, Research Note 81-7, Reenlistment Motivation of First Term Enlisted Men and Women, Personnel Decision Research Institute, Personnel Utilization Technical Area, USARI, Minneapolis, MN, February 1980

John T. Warner, CRC 436, Military Compensation and Retention: An Analysis of Alternative Models and Simulation of a New Retention Model, Center for Naval Analyses, Alexandria, VA, August 1981

ELIM-COMPLIP System Documentation, Volume I - Executive Overview, General Research Corporation, McLean, VA, March 1980

Pilot Study of the Perceived Value of Military Benefits, Hay Associates, Philadelphia, PA, August 1978

Veronica F. Nieva, et al., NCO Retention, USARI Personnel Utilization Technical Area, Rockville, MD, July 1982

A Study of Issues Related to Accession and Retention of Enlisted Personnel in the Reserve Component, Associates for Research in Behavior, Inc., Philadelphia, PA, November 1977

Nancy Guinn, et al., Reenlistee/Non-Reenlistee Profiles and Prediction of Reenlistment Potential, Personnel Research Division, Lackland, AFB, TX, June 1977

Juri Toomepuu, ACN 640-24, Soldier Capability - Army Combat Effectiveness (SCACE) Volume I - Main Report, Fort Benjamin Harrison, IN, April 1981

Robert H. Upchurch, Some Causes of Conflicting Quality and Performance Standards of US Army Enlistees 1973-1975, Fort Leavenworth, KS, June 1976

H. Wallace Sinaiko, et al., Military Personnel Attrition and Retention: Research in Progress, TR-10, Smithsonian Institution, Washington, DC, October 1981

The Utilization of People-Related Army RDT&E Annual Report FY 1980, USARI, Alexandria, VA, 1981

Dr. Neil S. Dumas, Project B: A Prototype Computerized Personnel Allocation System with Appendix; Project A - Army Selection and Classification Measures (Development and Validation), USARI, Alexandria, VA, November 1981

Box, G. E. P., and Wilson, K. B., On the Experimental Attainment of Optimum Conditions, Journal of the Royal Statistical Society, Series B, Vol 13, No. 1, 1951

Box, G. E. P., The Exploration and Exploitation of Response Surfaces I, Biometrics, Vol 10, 1954

Box G. E. P., and Youle, P. V., The Exploration and Exploitation of Response Surfaces II, Biometrics, Vol II, 1955

Box G. E. P., Hunter, W. G., and Hunter, J. S., Statistics for Experimenters, John Wiley & Sons, New York, NY, 1978

Dixon, W. J., and Massey, F. J., Introduction to Statistical Analysis, Third Edition, McGraw-Hill Book Company, Inc., New York, NY, 1969

Draper, N. R., and Smith, H., Applied Regression Analysis, Second Edition, John Wiley & Sons, New York, NY, 1981

Hill, W. J., and Hunter, W. G., A Review of Response Surface Methodology: A Literature Survey, Technometric, Vol 8, 1966

Mead, R., and Pike, D. J., A Review of Response Surface Methodology from a Biometric Viewpoint, Biometrics, Vol 31, 1975

Ostle, B., Statistics in Research, Second Edition, The Iowa State University Press, Ames, Iowa, 1963

APPENDIX D

FITREQUEST SURVEY

Instructions for the Administration of the

First-Term Reenlistment Quality Study (FITREQUEST) Survey

I. Survey Purpose. This survey, which rates the first-term enlistee, is being conducted by the US Army Concepts Analysis Agency for the Office of the Deputy Chief of Staff for Personnel (DCSPER). The information collected will be strictly for the purpose of developing a procedure that will assist the Department of the Army in identifying high quality soldiers for retention beyond the first enlistment. This information will not be divulged and will be used solely for the purpose of helping to identify those factors which can be used as predictors of high quality in our soldiers. Your help in completing this survey is greatly appreciated.

II. General Instructions for Administering the Survey

A. The survey is comprised of a four-part questionnaire which is being administered to officers and NCOs of randomly selected company level units throughout CONUS and Europe, and an accompanying personal data sheet. Your unit was one of those selected. The supervisory personnel completing the questionnaire must be in the grade of E6 (or E5 on promotion list) through O4 and also be in the supervisory chain of command of randomly selected first-term soldiers from your unit. The first-term soldiers must not be present when the questionnaires or personal data sheets are being completed.

B. There are sufficient copies of the questionnaire inclosed to allow for a total of five supervisors to rate each selected first-termer. Maximum participation by supervisors must be encouraged in order for the survey to be successful.

C. Part IV of the questionnaire contains a list of the first-term soldiers to be rated. Every attempt must be made to have at least three supervisors rate each first-termer. The Company Commander and First Sergeant are expected to rate every first-termer on the list.

D. The personal data sheets must be completed by personnel with access to the Personnel Data Cards (DA Form 2475-2). A data sheet must be completed on each first termer being rated in order for the study to produce valid results.

E. This survey is personal in nature and will be handled accordingly. In order for your unit to be included in the survey results, it is essential that the survey be administered and returned to the Concepts Analysis Agency no later than 15 days after receipt.

F. The Autovon numbers listed below may be used to contact personnel who can provide answers to questions which pertain to the instructions or completion of questionnaire.

Name	Autovon number
LTC Ronald M. Guiberson	295-5286
MAJ Robert A. DeGrasse	295-1648
Mr. John W. Haley	295-5293

III. Verbatim Instructions for Administering the Questionnaire

A. The questionnaire has been designed to be administered on either a group or individual basis. To accommodate both methods, a set of verbatim instructions has been incorporated in both this instruction sheet (paragraph B below) and in the questionnaire (cover page). If administered on an individual basis, any STOP instruction at the bottom of a page should be disregarded.

B. If administered on a group basis, the administrator must read the following verbatim instructions after providing each supervisor present with a copy of the questionnaire.

1. We are here today to complete a survey sponsored by the Department of the Army. Each of you has a copy of the survey before you. Please read silently along with me as I read aloud the purpose of this survey, as written at the top of the cover page. After we finish reading the purpose, read the Privacy Act Statement to yourselves. When you have finished reading the privacy statement, stop and turn the cover page over, face down.

2. Now complete Part I, background information. When you have finished with Part I, stop and turn Part I face down on top of the cover page.

3. Next complete a separate Part II for each soldier within your line of supervision. The list of soldiers to be rated is contained in Part IV. Sufficient copies of Part II are included in your packet to allow each of you to complete one for each soldier you supervise. Do not rate any soldier that you do not supervise. The extra copies of Part II that you do not use should be set aside. When you have finished with Part II, stop and place Part II face down on top of Part I.

4. Now complete Part 111, A and B. This part requires you to rate the factors which are important as indicators of high quality in our soldiers. Each factor should be rated even if you feel the factor is insignificant as an indicator. When you have finished with Part III, A and B, stop and place Parts III A and B face down on top of Part II.

5. Next complete Part IV by rating the same soldiers you rated in Part II. When you have completed Part IV, stop and place it face down on top of Part IIIB.

6. This completes the survey. Turn it over, face up, and staple it in the upper lefthand corner. Now pass the completed survey in to me.

IV. Instructions for Returning the Completed Surveys

The individual in your unit who is responsible for administering the survey must ensure that all completed questionnaires and personal data sheets are collected and returned to the unit commander. The personal data sheets must be checked to assure that the correct name and SSAN have been entered on each sheet. The unused questionnaires and extra copies of Part II will also be returned to the unit commander.

ATZ-NCR-MA-83-10

US ARMY CONCEPTS ANALYSIS AGENCY

SURVEY OF SUPERVISORY PERSONNEL CONCERNING

HIGH QUALITY FIRST-TERM ENLISTEES

This survey was developed by the US Army Concepts Analysis Agency, a field Operating Agency under the jurisdiction of the Director of the Army Staff. It is sponsored by the Deputy Chief of Staff for Personnel, Headquarters, Department of the Army. Your unit is one of the almost 200 company-sized units which have been randomly selected to participate in the survey.

The survey was designed to obtain information from you concerning your views about what is important in making a first-term soldier a quality soldier. Since you are an experienced soldier with proven leadership abilities, we need your views to help us learn how those who interact with first-term soldiers on a daily basis feel about the first-termer's abilities.

In order to provide you a concrete reference we have randomly selected first-term soldiers from your company's roster for you to rate. The information gathered here will not be used for any purposes other than this study of first-term quality. Information collected in this survey about specific individuals will NOT be known by or used by anyone having any contact or connection with the individuals being rated.

Please read all of the questions carefully and answer them to the best of your ability and professional judgment.

PRIVACY ACT STATEMENT

Public Law 93-573, called the Privacy Act of 1974, requires that you be informed of the purpose and uses to be made of the information collected.

The information collected will be utilized to develop a statistical analysis to determine valid quality indicators of first-term enlistees.

Providing information on this form is voluntary. Failure to respond to any question or group of questions will not result in any adverse action against the respondent. However, failure to participate could result in an inaccurate estimation of the quality indicators and their ranking.

The Department of the Army is collecting this information under the authority of Title 5, United States Code, Section 301.

STOP! DO NOT PROCEED UNTIL TOLD TO DO SO

ATZ-NCK-MA-83-10

FITREQUEST

QUESTIONNAIRE

PART I

BACKGROUND INFORMATION

1. Location: _____

2. Unit: _____

3. Rank/Grade: _____

4. Primary MOS: _____

5. Duty MOS: _____

6. What is the highest level of schooling you have completed? (Check one)

   a. __ 11th grade or lower
   b. __ High school graduate (diploma or GED)
   c. __ Some college
   d. __ College graduate or higher

7. What kind of supervisory position do you hold in this unit? (Check all that apply)

   a. __ Section Leader
   b. __ Squad Leader
   c. __ Platoon Sergeant
   d. __ Platoon Leader
   e. __ First Sergeant
   f. __ Company Commander
   g. __ Other supervisory position (please specify) _____
   h. __ Nonsupervisory position (If you checked this line you are not eligible to complete this questionnaire. Please turn it in at this time.)

8. How many months have you been in your current position? ____ months

9. How many months have you been in this unit? ____ months

10. How long have you been in the Army? ____ years ____ months

11. How many enlisted soldiers do you currently supervise? _____ EP

12. What is the cumulative amount of time which you have held supervisory jobs in the Army? ____ years ____ months

STOP! DO NOT PROCEED UNTIL TOLD TO DO SO

ATZ-NCR-MA-83-10

PART II

Please complete one of these forms for each soldier within your line of supervision who is listed on the rating sheet at Part IV. Do not rate any soldier that you do not supervise. Consider all the soldiers assigned to your unit for comparison. The scale to be used in rating various factors of the soldier's quality is shown below. Assigning a score of "100" on a factor would indicate a superior display of quality by the soldier; and a score of "0" would reflect the lowest possible rating. Choose any score value ranging between and including zero and one hundred. Copies of this form which you do not use should be turned in separately.

Quality Scale

Enter the name and SSAN of the soldier to be rated on the line below.

Name SSAN

_____ _____

Subjective factors	Soldier's score on each factor
Ability to Get Along With Others	____
General Discipline	____
Military Bearing (accepts authority and military practices)	____
Personal Appearance	____
Job Performance	____
Trainability	____
Leadership Potential	____
Moral and Social Conduct (conduct which brings credit to the military)	____
Communicates Well With Others	____

IF THIS IS THE LAST SOLDIER YOU ARE RATING,
STOP! DO NOT PROCEED UNTIL INSTRUCTED TO DO SO

ATZ-NCK-MA-83-10

PART III-A

Listed below are various factors which might be used in judging the quality of a soldier and whether or not the soldier should be allowed to reenlist in your unit. Please use the scale below (0 through 4) for showing the level of importance that you feel should be assigned to each of the factors in judging a soldier's quality. Do not be concerned about current formal practices for judging reenlistment eligibility; think only in terms of what you think is important for your soldiers and your unit. If you feel that a factor is of no importance in judging who should be allowed to reenlist in your unit, write a "0" in the column to the right of that factor. If you feel that a factor is of only moderate importance, place a "1" in the column to the right of that factor. For any factor that you feel is important, write "2" in the column. If a factor is extremely important, assign it a "4."

SCALE: 0 Of no importance
1 Moderately important
2 Important
3 Very important
4 Extremely important

Quantitative factors in judging individual soldier quality	Your opinion about the importance of each factor
AFQT Score (includes GT Score)	____
Civilian Education	____
Rank (relative to time in service)	____
Military Education	____
SQT Score	____
Individual Weapon Score	____
Awards and Decorations	____
Weight Control	____
Physical Profile	____
Physical Readiness Score	____
Article 15s	____

TURN TO PART III-B, NEXT PAGE, AND CONTINUE

ATZ-NCR-MA-83-10

PART III-B

Listed below are various factors which might be used in judging the quality of a soldier and whether or not the soldier should be allowed to reenlist in your unit. Please use the scale below (0 through 4) for showing the level of importance that you feel should be assigned to each of the factors in judging a soldier's quality. Do not be concerned about current formal practices for judging reenlistment eligibility; think only in terms of what you think is important for your soldiers and your unit. If you feel that a factor is of no importance in judging who should be allowed to reenlist in your unit, write a "0" in the column to the right of that factor. If you feel that a factor is of only moderate importance, place a "1" in the column to the right of that factor. For any factor that you feel is important, write "2" in the column. If a factor is extremely important, assign it a "4."

SCALE: 0 Of no importance
1 Moderately important
2 Important
3 Very important
4 Extremely important

Subjective factors	Your opinion about the importance of each factor
Ability to Get Along With Others	____
General Discipline	____
Military Bearing (accepts authority and military practices)	____
Personal Appearance	____
Job Performance	____
Trainability	____
Leadership Potential	____
Moral and Social Conduct (conduct which brings credit to the military)	____
Communicates Well With Others	____

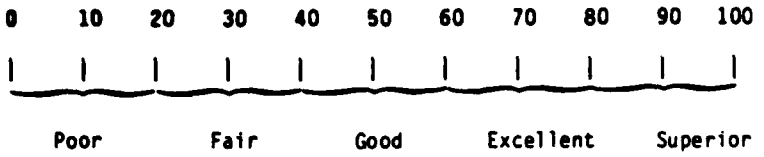
STOP! DO NOT PROCEED UNTIL INSTRUCTED TO DO SO

ATZ-NCR-MA-83-10

PART IV

Please rate those soldiers listed on the next page who are in your line of supervision. The soldiers you rate will be the same ones that you rated in Part II. Provide a numerical score from 0 to 100 which best indicates your evaluation of his/her quality. A score between 80 and 100 should be assigned to a soldier of superior quality. Use the Quality Scale provided to assist you in rating each soldier. The remarks column is provided to enter information which will assist in clarifying ratings. For example, Bar to Reenlistment, prolonged hospitilization, repeated AWOLs, marksmanship team, etc.

Quality Scale



Example:

RATING SHEET

UNIT: C - 1/17th

NAME	RANK	SSN	MOS	RATING	REMARKS
Johnny B. Good	E3	000 00 0000	96G	94	
Fred R. Crummy	E3	000 00 0001	96G	36	
James G. Dugood	E4	000 00 0004	96G	10	Bar to reenlistment

TURN TO NEXT PAGE AND ENTER RATINGS

ATZ-NCR-MA-83-10

PERSONAL DATA SHEET

1. The following information is to be provided for each individual soldier listed on the attached Rating Sheet.

Name SSN

_____ _____

a. Military education:

(1) Has individual completed BNOC or PNOC course? _____

(2) Has individual completed PLC course? _____

(3) Has individual completed extension or correspondence courses? _____

(4) Has individual completed any courses (1 week in duration) not mentioned? _____ If so, please list.

b. Skill qualification score: Provide the soldiers latest raw SQT score from his/her individual soldier report or USAEREC Form 10A.

_____

c. Individual weapon score: Provide the soldier's latest raw score for his/her assigned weapon qualification. MM__SS__Expert__

d. Indicate all awards and decorations individual soldier has attained. Please use list provided.

___ Soldier's Medal or higher award
___ Bronze Star Medal (Valor or Merit)
___ Meritorious Service Medal
___ Defense Meritorious Service Medal
___ Air Medal (Valor or Merit)
___ Joint Service Commendation Medal
___ Army Commendation Medal (Valor or Merit)
___ Army Achievement Medal
___ Purple Heart
___ Combat Infantry Badge
___ Combat Field Medical Badge
___ Good Conduct Medal
___ Expert Infantry Badge

___ Expert Field Medical Badge
___ Parachutist Badge
___ Diver's Badge
___ Explosive Ordnance Disposal Badge (permanent awards only)
___ Pathfinder Badge
___ Aircraft Crewman Badge (permanent awards only)
___ Nuclear Reactor Operator Badge
___ Ranger Tab
___ Driver and Mechanic Badge
___ Air Assault Badge
___ Certificate of Achievement (DA Form 2442) (see memo in MPRJ) and locally designed certificates (awarded by commander serving in positions authorized the rank of LTC (O5) or higher) (see action pending section MPRJ).

e. Weight control program: Indicate category which pertains to individual soldier.

___ Not on weight control program.
___ On weight control program/satisfactory progress.
___ On weight control program/unsatisfactory progress.

f. Physical readiness: Provide raw score for individual's last (for record) physical readiness score. ____

g. Has this soldier received any Article 15s while in your unit? ____ If yes, how many? _____

APPENDIX E

PREDICTION EQUATIONS OF OVERALL QUALITY

The following tables, E-1 through E-4, provide the prediction equations of overall quality which were derived for each CMF analyzed, the three broad mission area classifications, and the Army-wide application. Of the original 19 CMFs surveyed, insufficient data was received to analyze CMFs 16, 29, 96, and 98; therefore, prediction equations for these CMFs will not be found in the tables.

Table E-1. Prediction Equations of Overall Quality for Combat Arms

CMF 11 (Infantry)

$$Y = 1.04 + 4.08\ X11 + 0.18\ W2 + 0.30\ W3 + 0.12\ W5 + 0.27\ W7$$

$$(F = 384.8,\ R^2 = 87\%,\ n = 280)$$

CMF 12 (Combat Engineering)

$$Y = 15.56 + 4.21\ X11 + 0.40\ W3 + 0.31\ W9$$

$$(F = 179.8,\ R^2 = 70\%,\ n = 239)$$

CMF 13 (Field Artillery)

$$Y = -13.94 + 6.63\ X8 + 4.31\ X11 + 0.38\ W2 + 0.32\ W5 + 0.2\ W9$$

$$(F = 76.6,\ R^2 = 83\%,\ n = 80)$$

CMF 19 (Armor)

$$Y = -11.3 + 3.97\ X3 + 3.32\ X4 + 0.06\ X10 + 6.48\ X11 + 0.27\ W3 + 0.16\ W4 + 0.32\ W7$$

$$(F = 92.9,\ R^2 = 78\%,\ n = 188)$$

Combined equation for combat arms (CMF 11, 12, 13, 19)

$$Y = 6.45 + 4.18\ X11 + 0.19\ W2 + 0.24\ W3 + 0.17\ W5 + 0.23\ W7$$

$$(F = 190.0,\ R^2 = 79\%,\ n = 787)$$

Table E-2. Prediction Equations of Overall Quality for Combat Support

CMF 31 (Communication-Electronic Operations)

$$Y = 6.34 + 0.35\ W2 + 0.25\ W5 + 0.35\ W7$$

$$(F = 286.0,\ R^2 = 84\%,\ n = 160)$$

CMF 54 (Chemical)

$$Y = 10.06 + 0.28\ W1 + 0.36\ W7 + 0.25\ W8$$

$$(F = 328,\ R^2 = 89\%,\ n = 128)$$

CMF 67 (Aviation Maintenance)

$$Y = 1.52 + 0.04\ X10 + 0.13\ W4 + 0.24\ W5 + 0.22\ W7 + 0.31\ W8$$

$$(F = 200,\ R^2 = 92\%,\ n = 99)$$

CMF 91 (Medical)

$$Y = 4.77 + 0.35\ W1 + 0.24\ W2 + 0.35\ W7$$

$$(F = 204,\ R^2 = 83\%,\ n = 125)$$

CMF 95 (Law Enforcement)

$$Y = 4.04 + 0.29\ W1 + 0.23\ W2 + 0.18\ W3 + 0.23\ W8$$

$$(F = 228,\ R^2 = 85\%,\ n = 159)$$

Combined equation for combat support (CMF 31, 54, 67, 91, 95)

$$Y = 5.79 + 0.18\ W1 + 0.16\ W2 + 0.19\ W5 + 0.24\ W7 + 0.17\ W8$$

$$(F = 282.0,\ R^2 = 85\%,\ n = 671)$$

Table E-3. Prediction Equations of Overall Quality for Combat Service Support

CMF 51 (General Engineering)

$$Y = 4.16 + 4.82\ X11 + 0.34\ W3 + 0.13\ W5 + 0.39\ W7$$

$$(F = 146.0,\ R^2 = 89\%,\ n = 70)$$

CMF 63 (Mechanical Maintenance)

$$Y = 17.71 + 2.47\ X11 + 0.35\ W2 + 0.41\ W7$$

$$(F = 317,\ R^2 = 76\%,\ n = 299)$$

CMF 64 (Transportation)

$$Y = 7.89 + 0.06\ X1 + 0.21\ W2 + 0.15\ W3 + 0.28\ W5 + 0.23\ W7$$

$$(F = 165.0,\ R^2 = 81\%,\ n = 197)$$

CMF 71 (Administration)

$$Y = 1.79 + 2.07\ X3 + 2.83\ X11 + 0.11\ W2 + 0.13\ W3 + 0.23\ W5 + 0.17\ W6 + 0.12\ W7 + 0.11\ W8$$

$$(F = 79,\ R^2 = 86\%,\ n = 100)$$

CMF 76 (Supply and Services)

$$Y = 12.86 + 2.34\ X7 + 2.14\ X11 + 0.30\ W2 + 0.16\ W5 + 0.31\ W7$$

$$(F = 214,\ R^2 = 79\%,\ n = 293)$$

CMF 94 (Food Service)

$$Y = 1.16 + 13.37\ X4 + 0.38\ W1 + 0.57\ W6$$

$$(F = 102.1,\ R^2 = 91\%,\ n = 46)$$

Combined equation for combat service support (CMF 51, 63, 64, 71, 76, 94)

$$Y = 10.31 + 2.30\ X11 + 0.33\ W2 + 0.21\ W6 + 0.30\ W7$$

$$(F = 110,\ R^2 = 80\%,\ n = 1,005)$$

Table E-4. Prediction Equation of Army-wide Overall Quality

Army-wide
$Y = 6.44 + 2.41\ X11 + 0.10\ W1 + 0.15\ W2 + 0.09\ W3 + 0.18\ W5 + 0.24\ W7 + 0.11\ W8$
$(F = 367.2,\ R^2 = 82\%,\ n = 2,501)$

APPENDIX F

A CONCEPTUAL METHOD OF IMPLEMENTATION

Figure F-1 represents a conceptual method for implementing the study results. Use of this method does not eliminate present reenlistment policy and procedure. It strengthens the reenlistment program by actively involving the unit leadership in the selection process for reenlisting quality first-term soldiers in the Army.

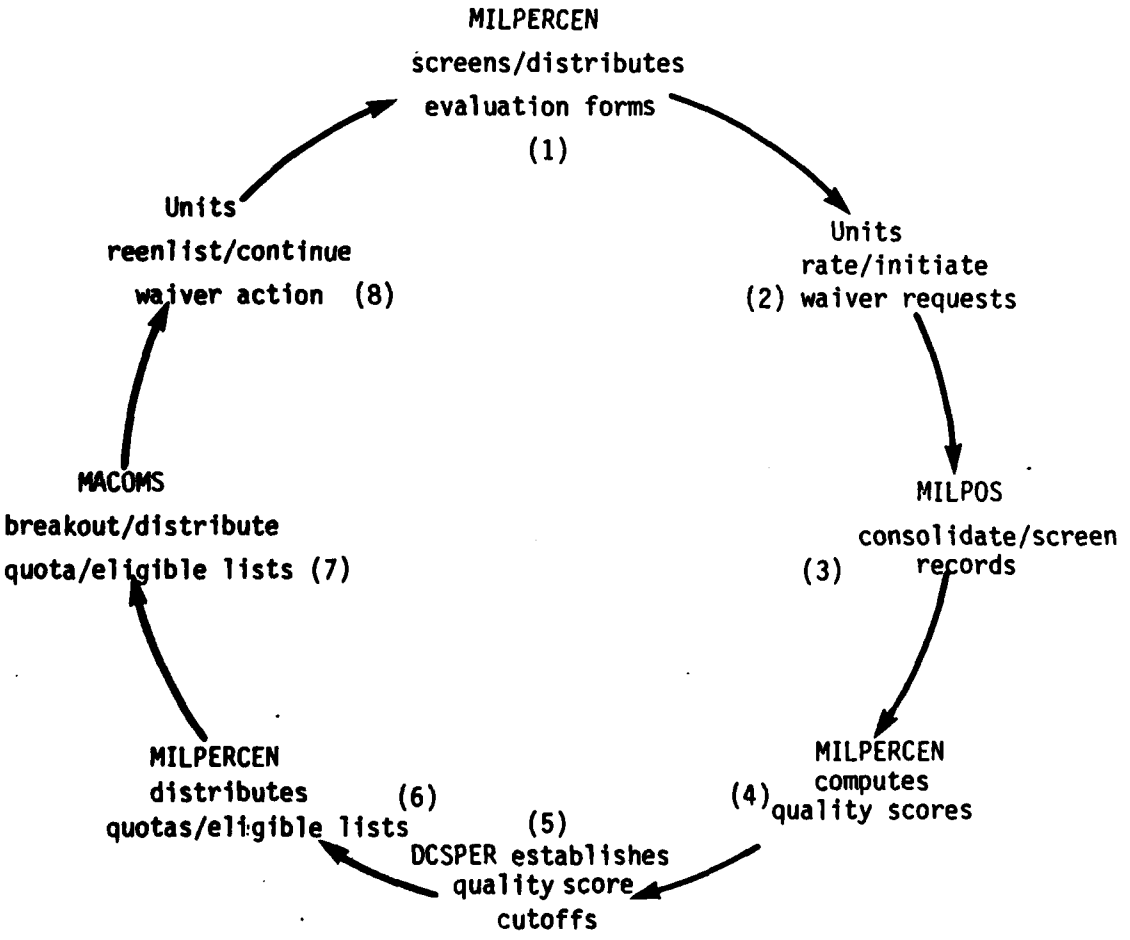


Figure F-1. Conceptual Method of Implementation

The following eight-step process should be used to implement the methodology in Figure F-1.

Step 1 - Nine months prior to their reenlistment eligibility date, MILPERCEN screens and identifies all first-term soldiers eligible for reenlistment, and all ineligibles who possess waivable reenlistment criteria under the provision of AR 601-280. Ineligibles who do not possess waivable criteria will be discharged from the service as scheduled. Prepunched or mark-sense quality evaluation forms are prepared on these soldiers and distributed to company level units. These forms will contain instructions for evaluation of first-term soldiers on the nine subjective indicators. Directions will be provided for the company leadership (Commander, First Sergeant, Platoon Leader/Sergeant and Squad Leaders) to subjectively evaluate all eligible first-term soldiers and those ineligibles for whom a waiver will be requested. The remaining ineligibles will not be evaluated and will be scheduled for discharge at the appropriate time. MILPERCEN also requests that units provide data on those objective indicators which are not available on the Enlisted Master File (EMF):

- Military Education (completed PLC, BNOC, extension courses)
- Skill Qualification Test Score
- Individual Weapons Qualification Category (Marksman, Sharpshooter, Expert)
- Awards and Decorations received
- Weight Control Program Data (not on weight control; on weight control, making satisfactory progress; on weight control, progress unsatisfactory)
- Physical Readiness Test Score
- Number of Article 15s received in unit

Step 2 - The unit leadership mentioned in Step 1 prepares independent subjective ratings on first-term soldiers, provides objective data missing from EMF and initiates requests for waivers on ineligibles if they desire to reenlist. Requests for waivers are approved/disapproved at the echelon specified by regulation.

Step 3 - Local military personnel offices consolidate ratings, check them for completeness, ensure that requested objective indicator data on each evaluated soldier is present and screen the field personnel records to verify eligibility/ineligibility for reenlistment. This data is then forwarded to MILPERCEN.

Step 4 - MILPERCEN computes quality scores for all first-term soldiers eligible to reenlist and forwards results to DA, ODCSPER.

Step 5 - DA, ODCSPER, establishes the reenlistment quality score cutoffs for each CMF based upon ceilings imposed by mandatory end-strength requirements.

Step 6 - MILPERCEN forwards quotas and the list of soldiers eligible to reenlist to the MACOMs.

Step 7 - MACOMs establish installation/unit quotas and forward the list of eligibles.

Step 8 - Unit reenlists the eligibles and continues waiver procedures on those soldiers they desire to reenlist but who failed to meet the quality cutoff score.

This method envisions use of the equations of estimated overall quality derived during this study. Because peoples' perceptions change, regulations are revised, manpower requirements vary, and for other cogent reasons, the equations will have to be updated periodically. This can be done by again requiring unit supervisors to provide an overall quality rating on their first-term soldiers in addition to ratings on the subjective indicators. These ratings would then be used to recompute the coefficients and derive updated prediction equations of overall quality.

GLOSSARY

1. ABBREVIATIONS, ACRONYMS, AND SHORT TERMS

AFQT	Armed Forces Qualifying Test: the combination of four subtests from the Armed Services Vocational Aptitude Battery (ASVAB) to provide a general measure of trainability and primary criterion of enlistment eligibility.
ARI	US Army Research Institute for the Behavioral and Social Sciences: an agency working on long-range studies impacting on personnel policies for the Army Staff.
ARSTAF	Department of the Army Staff
ASVAB	Armed Services Vocational Aptitude Battery: a series of tests given to prospective enlistees to determine aptitude for various fields in the Army to assist in placing enlistees in positions best suited to the individual and the Army.
ATC	Army Training Command
CAA	US Army Concepts Analysis Agency: an operating agency of the Department of the Army Staff under the control of the Director of the Army Staff where short-range studies are conducted for the Army Staff.
CIVED	civilian education level
CMF	Career Management Field: a manageable grouping of related military occupational specialties that guide enlisted soldiers' careers from skill level 1 through skill level 5.
CONUS	Continental United States
DA	Department of the Army
DCSPER	Deputy Chief of Staff for Personnel
EEA	essential element(s) of analysis
EMF	Enlisted Master File: the file of official records for all enlisted soldiers in the Army.

ETS	expiration term of service
EX	expert
FITREQUEST	First-Term Reenlistment Quality Study
GCMCA	general court-martial convening authority
GED	general educational development
HQDA	Headquarters, Department of the Army
IPR	in progress review
MACOM	major Army command
MILED	military education level
MILPERCEN	US Army Military Personnel Center
MM	marksman
MOS	military occupational specialty
MSU	major subordinate unit
NCO	noncommissioned officer
OCONUS	outside the Continental United States
ODCSPER	Office of the Deputy Chief of Staff for Personnel
PDS	personal data sheet
PMOS	primary military occupational specialty
PRT	physical readiness test
R^2	coefficient of determination
SAG	Study Advisory Group
SPSS	Statistical Package for the Social Sciences: a computer software package for statistical analysis of inputted data.

SQT	Skill Qualification Test: a job oriented criterion referenced test of the soldier's ability to perform critical tasks required by assigned military occupational specialty. It is used to assess task competence for training feedback and for personnel management purposes.
SS	sharpshooter
SSC-NCR	US Army Soldier Support Center - National Capital Region
TRADOC	US Army Training and Doctrine Command
USAREC	US Army Recruiting Command

2. DEFINITIONS

ability to get along	Able to take direction or correction from supervisors or peers and contribute to the well being of the unit.
Article 15	Light punishment and other corrective measures imposed by a commanding officer upon any military person who does not demand trial by courts-martial (non-judicial punishment).
awards and decorations	The number and type of awards and/or decorations the soldier has attained.
careerists	Those individuals who have completed their first-term enlistment period and have reenlisted.
communicates well	Able to express, orally and in writing, thoughts and knowledge to others in understandable language.
dependent variable	The overall quality of a first-term soldier as perceived by unit supervisors
frame	The unit supervisors of first-term soldiers.
general discipline	Does or does not commit acts causing counseling or reprimands short of nonjudicial punishment. Includes such items as letters of indebtedness, disrespect, and minor infractions of orders.

independent variables	A subjective or objective indicator which describes an element of quality for a first-term soldier.
job performance	Ability of soldier to accomplish the tasks given in an efficient, effective manner.
leadership potential	Demonstrated leadership ability or principles and traits that could be strengthened to develop an ability to handle ever increasing levels of responsibility.
military bearing	Appearance of correct posture, manners, and awareness of protocol. Demonstrated knowledge of military courtesy.
model, mathematical	An equation that prescribes the empirical relationship between a set of independent variables and a dependent variable.
moral and social conduct	Soldier conducts self in a manner that is socially acceptable and in conformance with accepted morals; does not bring discredit to Army by personal actions.
objective indicators	Independent variables which can be accurately measured according to a specific scale. For the purpose of this study and in the design of the survey questionnaire, the following 11 indicators were listed as objective indicators for which scores were quantifiable and taken from the EMF or unit records. The indicators are: AFQT, civilian educational level, rank, military educational level, skill qualification test score, weapons qualification level (MM, SS, EX), awards and decorations received, weight program, physical profile, physical readiness test score, and number of Article 15s received.
personal appearance	Conscious efforts made toward good grooming and proper wear of uniform. Includes haircuts, ironed clothes, shoes shined, etc.
physical profile	Estimate of overall ability of an individual to perform military duties by consideration of his physical and mental condition. Six factors, designated PULHES, are expressed numerically. These factors are: P - physical capacity or stamina U - upper extremities L - lower extremities H - hearing (including ear defects) E - eyes S - neuropsychiatric

quality indicator ranking	The relative ranking by unit supervisors of the importance of a quality indicator.
rank	The pay grade held by the soldier.
regression coefficient	A numerical weighting of a quality indicator contained in a prediction equation.
subjective variables	Independent variables whose values are determined by judgment. For the purpose of this study and in the design of the survey questionnaire, the following nine indicators were listed as subjective indicators where ratings were subjectively assigned by the supervisor completing the questionnaire. The indicators are: ability to get along with others, general discipline, military bearing, personal appearance, job performance, trainability, leadership potential, moral and social conduct, and communicates well with others.
target population	First-term soldiers in the US Army.
trainability	Ability to learn from others, both in a formal or informal structured class. Ability to grasp new concepts and directions.
weapons qualification	The required training and practical test applied to the firing of a soldier's individual weapon and categorized as Expert (EX), Sharpshooter (SS), or Marksman (MM) in terms of individual ability.
weight control	The control system where each soldier's height and weight are measured against a standard to determine need for reduction of overweight.

CAA	FIRST-TERM REENLISTMENT QUALITY STUDY (FITREQUEST)	ONE SHEET STUDY GIST CAA-SR-83-13

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) There is no widely accepted, general, useful definition of soldier quality available in the US Army.

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(3) Objective data is often incomplete or unavailable.

(4) A subset of the objective and subjective indicators can be used to identify which first-term soldiers their supervisors would consider to be of high quality for reenlistment.

(5) Unit level chain of command perception and HQDA DA policy can be combined in a mutually supportive system for identifying soldiers for reenlistment.

(6) Implementation of a system for estimating quality of first-term soldiers which includes both HQDA and the unit level chain of command will increase the administrative workload.

THE MAIN ASSUMPTION on which the work reported herein rests is as follows:

Local commanders desire to participate in the reenlistment decision process.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) Some elements of quality may not be measurable.

(2) The study considered only soldiers eligible to reenlist in the Army for the first time. Of the 823 first-term soldiers included in the study, only 164 had complete records of objective data.

(3) Only enlisted personnel in the grades of E6 through E8 and officers O1 through O4 participated in the survey.

THE SCOPE OF THE STUDY focused on Active Army first-term soldiers in the grade E4 and below to develop a valid and reliable method for identification of the best qualified potential reenlistees, on either an Army-wide or CMF basis.

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THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel, who established the objectives and monitored study activities.

THE STUDY EFFORT was directed by COL Franklin R. Dillard, Personnel Systems Analysis Division, Force Systems Directorate.

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